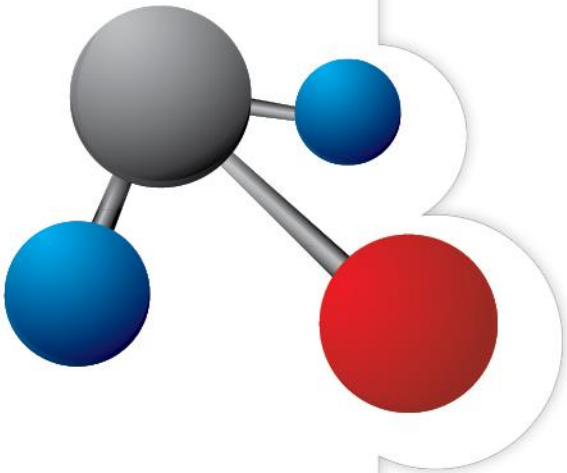
GRWD – 2024 USER EXPANSION



PREPARED FOR:

Greater Ramsey Water District

Devils Lake, North Dakota

AE2S Project No. P04013-2023-001

January 2025

PROJECT MANUAL

Advanced Engineering and Environmental Services, LLC
4050 Garden View Drive, Suite 200
Grand Forks. ND 58201
Ph: 701-746-8087 Fax: 701-746-0370
Web: www.AE2S.com

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PROCUREMENT AND CONTRACTING REQUIREMENTS

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PLANS AND SPECIFICATIONS

FOR

GRWD – 2024 USER EXPANSION

GREATER RAMSEY WATER DISTRICT

DEVILS LAKE, NORTH DAKOTA

JANUARY 2024

CIVIL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

Geoffrey Slick, PE, AE2S, LLC

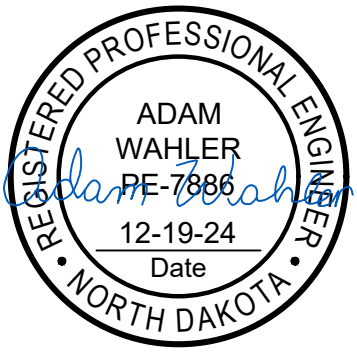
Date: 12-19-2024 Reg. No. PE-9235

ELECTRICAL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of North Dakota.

Adam Wahler, PE, AE2S, LLC

Date: 12-19-2024 Reg. No. PE-7886



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SECTION 00 01 10 – TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

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SOLICITATION

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SECTION 00 11 13 – ADVERTISEMENT FOR CONSTRUCTION BIDS

OWNER: Greater Ramsey Water District (GRWD)
ADDRESS: 113 Shamrock Lane SE, Devils Lake, ND 58301

Separate sealed Bids for construction of the GRWD – 2024 User Expansion; will be received at the office of Advanced Engineering and Environmental Services (AE2S), 4050 Garden View Drive Suite 200, Grand Forks, ND, 58201, until 2:30 p.m., local time, on the 30th day of January 2025 where and at which time shortly thereafter they will be publicly opened and read aloud.

Bids can be mailed to: AE2S
Attn: Geoff Slick, PE
4050 Garden View Drive Suite 200
Grand Forks, ND 58201

The Work is comprised of one (1) Contract with three (3) Base Bids and three (3) Bid Alternates. Contract No. 1 will award the Base Bids with or without any combination of the Alternates; Alternates with an 'A' or a 'B' option will award the 'A' option only or the 'A' and 'B' options if the corresponding alternate is accepted for award. Alternates with 'B' designation will not be awarded without award of the corresponding 'A' option. The Work is generally described as follows:

Contract No. 1: Pipeline Construction:

1. **Base Bid No. 1 – User Expansion:** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 420,000 feet of 2-inch DR 11 IPS POLY pipeline, 4,000 feet of 3-inch DR 11 IPS POLY pipeline, 52,500 feet of 2-inch DR 11 IPS POLY directional bores, 400 feet of 3-inch DR 11 IPS POLY directional bores, one (1) steel cased railroad and highway bore, thirty-six (36) fittings ranging in size from 2-inch to 3-inch, ninety-four (94) tie-ins to the existing system, twenty-five (25) gate valves ranging in size from 2-inch to 3-inch, one-hundred twenty-four (124) residential curb stop valves, eighty-six (86) residential meter setter units, thirty-eight (38) frost-proof meter pits, one (1) 2-inch PRV manhole, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, gravel, and pavement repair.
2. **Base Bid No. 2 – Highway 19 Expansion (Poly):** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 200 feet of 2-inch DR 11 IPS POLY pipeline, 100 feet of 8-inch DR 13.5 IPS POLY pipeline, 15,000 feet of 12-inch DR 17 IPS POLY pipeline, 2,575 feet of 12-inch DR 17 IPS POLY directional bores, six (6) 12-inch fittings, four (4) tie-ins to existing system, four (4) gate valves ranging in size from 8-inch to 12-inch, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
3. **Base Bid No. 3 – Webster Connection:** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 100 feet of 2-inch DR 11 IPS POLY pipeline, 100 feet of 6-inch DR 17 IPS POLY pipeline, 200 feet of 6-inch DR 17 IPS POLY directional bores, two (2) tie-ins to existing system, two (2) gate valves ranging in size from 2-inch through 6-inch, one (1) 1-inch flush/air blow-off valve,

one (1) 2-inch PRV and metering manhole, Electrical and I&C work to include cable and conduit between existing booster station and new vault, furnishing and installation of temperature and pressure transmitters, sump flood switch and receptacle for sump pump, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.

4. **Alternate No. 1 – Highway 19 Expansion (PVC):** Incremental cost difference to provide and install the following approximate quantities: 15,000 feet of 12-inch PVC SDR26 CL160 IPS pipeline in lieu of 15,000 feet of 12-inch DR 17 IPS POLY pipeline included as Work within Base Bid 2 – Highway 19 Expansion (Poly).
5. **Alternate No. 2 – Webster Transmission Expansion:** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 400 feet of 2-inch DR 11 IPS POLY pipeline, 21,500 feet of 4-inch DR 11 IPS POLY pipeline, 100 feet of 2-inch DR 11 IPS POLY directional bores, 650 feet of 4-inch DR 11 IPS POLY directional bores, one (1) 4-inch fitting, nine (9) tie-ins to existing system, eight (8) gate valves ranging in size from 2-inch to 4-inch, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
6. **Alternate No. 3A – South System Transmission Expansion (Poly):** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 42,500 feet of 8-inch DR 13.5 IPS POLY pipeline, 2,600 feet of 8-inch DR 13.5 IPS POLY directional bores, six (6) 8-inch fittings, two (2) tie-ins to existing system, five (5) 8-inch gate valves, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
7. **Alternate No. 3B – South System Transmission Expansion (PVC):** Incremental cost difference to provide and install the following approximate quantities: 42,500 feet of 8-inch PVC SDR26 CL160 IPS pipeline in lieu of 42,500 feet of 8-inch DR 13.5 IPS POLY pipeline included as Work within Alternate No 3A – South System Transmission Expansion (Poly).

All bids shall be contained in a sealed envelope plainly marked showing that such envelope contains a Bid for the Project. Also refer to Section 00 21 13 for preparation of bid information.

All Bids shall be prepared according to the Instructions to Bidders contained within the Project Manual. Each Bid shall be accompanied by a separate envelope containing a Bid Security in the form of a Bidder's Bond executed by the Bidder as principal and by a surety company authorized to do business in the State of North Dakota, payable to the Greater Ramsey Water District, in a sum equal to five percent (5%) of the full amount of the Bid. The surety must be listed as a certified surety in the U.S. Department of the Treasury's Circular 570A. A certified check in lieu of a surety company in the amount of 5% of the total project cost will not be accepted. This is to serve as a guarantee that the successful Bidder will enter into a Contract within ten (10) days of Notice of Award, in accordance with the terms of the principal's Bid and Contractor's Bond as required by law and regulations and determinations of Greater Ramsey Water District for the performances of such Work. Only Bids that are accompanied by such a Bond will be considered.

All Work shall be performed in accordance with the Bidding Documents on file in the Office of Greater Ramsey Water District, Devils Lake, ND where they may be seen and examined. Bidders must be licensed for the full amount of the Bid as required by North Dakota Century Code 43-07-05. Each Bid shall contain a copy of the Contractor's license or certificate of renewal thereof issued by the Secretary of State. All Bids must be submitted on the Bid Form furnished by the Engineer.

No Bid will be read or considered that does not fully comply with the above provisions and other provisions contained within the Bidding Documents, and any deficient Bid submitted will be returned to the Bidder unopened.

Each Bidder must possess a valid North Dakota contractor's license for the full amount of their bid, as required by N.D.C.C. § 43-07-07. Each bid must be accompanied by a copy of the Bidder's Contractor's License or Certificate of Renewal, issued by the North Dakota Secretary of State, and each license must be valid and dated at least 10 days prior to the date set for bid opening, as required under N.D.C.C. § 43-07-12.

The District will not read or consider any bid that does not include a proper Bidder's bond and contractor's license or renewal, as described above, and does not otherwise fully comply with the requirements of N.D.C.C. § 48-01.2-05.

Contracts shall be awarded on the basis of the low Bid submitted by a responsible and responsive Bidder deemed most favorable to the Owner's interest.

All Bids shall be contained in a sealed envelope plainly marked showing that such envelope contains a Bid for the Project. In addition, the Bidder shall place upon the exterior of such envelope the following information:

1. Project Name and Work covered by the Bidder (General).
2. The name of the Bidder.
3. Separate envelope containing Bid Bond, the Non-Collusion Affidavit, a copy of Contractor's License or Renewal Certificate, and Other Responsible Matters.
4. Acknowledgement of all Addenda.

Bids shall be mailed to AE2S, 4050 Garden View Drive Suite 200, Grand Forks, ND 58201.

Complete digital project Bidding Documents are available at www.AE2S.com or www.questcdn.com. You may download the digital plan documents for Fifty Dollars ($50.00) by inputting Quest project #9455409 on the website's Project Search page. Please contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in free membership registration, downloading, and working with this digital project information.

Copies of the Bidding Documents may also be seen and examined at the office of the Engineer, **Advanced Engineering and Environmental Services, LLC**, 4050 Garden View Drive Suite 200, Grand Forks, ND 58201. The Bidding Documents are available in the form of printed plans and specifications and/or electronic PDF's from Advanced Engineering and Environmental Services, LLC. The costs are $100.00 for electronic PDF's and $300.00 for printed documents, for each set of Documents obtained. Payment for Bidding Documents is **NON-REFUNDABLE**. All Work shall be done according to the Bidding Documents. Bidding Documents may also be examined at the offices of AE2S in Bismarck, Fargo, Williston, and Grand Forks, ND, and Maple Grove, MN; builders exchanges in Grand Forks, Bismarck, Minot, and Fargo, ND, and in Minneapolis, MN.

The work for Contract No. 1 must be completed no later than the following:

a. Base Bid No. 1
   1) Zone A
      A. Substantial Completion – November 15, 2025

B. Final Completion – June 15, 2026

2) Zone B

A. Substantial Completion – September 30, 2026

B. Final Completion – November 15, 2026

b. Base Bid No. 2
   1) Substantial Completion – October 15, 2025
   2) Final Completion – June 15, 2026

c. Base Bid No. 3
   1) Substantial Completion – August 31, 2025
   2) Final Completion – September 30, 2025

d. Alternate No. 1
   1) Substantial Completion – October 15, 2025
   2) Final Completion – June 15, 2026

e. Alternate No. 2
   1) Substantial Completion – September 30, 2026
   2) Final Completion – November 15, 2026

f. Alternate No. 3 (A and B)
   1) Substantial Completion – September 30, 2026
   2) Final Completion – November 15, 2026

All Bids will be made on the basis of cash payment for such work. After Bid opening, the Owner will return Bid security of all except the three lowest responsible Bidders. When the Contract is awarded, the remaining unsuccessful Bidder's Bonds will be returned. The Owner reserves the right to reject any or all Bids, and further reserves the right to award the Contract in the best interests of the Owner. The Owner reserves the right to hold the three (3) low Bids for a period of sixty (60) days after the date of the Bid opening to complete financial arrangements.

Dated this 2nd day of January 2025.

By: /s/ Doug Mohr, President
Greater Ramsey Water District
Publish on 01/9/2025, 01/16/2025, and 01/23/2025

INSTRUCTIONS FOR PROCUREMENT

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SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

A. *Bidder* - The individual or entity who submits a Bid directly to OWNER.

B. *Successful Bidder* - The lowest responsible Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER's evaluation as provided herein) makes an award.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Engineer. The cost, as stated in the Advertisement for Bids, is **NON-REFUNDABLE.**

2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit written evidence such as previous experience, present commitments, and such other data as may be called for below.

A. Bidders shall have qualifications performing work of similar type and size as this Project. Bidder shall have successfully completed a minimum of two (2) projects of similar complexity as this Project. ALL bidders shall submit, upon request, a thoroughly completed Bidder Qualifications Form. Failure to submit the above information on the provided form may be cause for rejection of the Bid.

B. The OWNER reserves the right to reject any Bid, if the experience qualifications submitted by, or investigation of, such Bidder fails to satisfy the OWNER that such Bidder is properly qualified to carry out the obligations of the agreement and to complete the work contemplated therein.

C. The Owner reserves the right to disqualify a superintendent based on past work history.

D. The Owner reserves the right to disqualify a bidder based on work history or any other factors impacting the bidder's status as a responsible bidder.

E. A contractor's license or renewal form must be submitted with the Bid.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

A. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

B. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Bidding Documents.

4.02 Underground Facilities

A. The Supplementary Conditions identify those reports and drawings relating to existing Underground Facilities at or contiguous to the Site, if any, that the Engineer has used in preparing the Bidding Documents.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.03.A 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 indicated in such drawings.

4.04 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 conditions appear in paragraphs 5.03, 5.04, and 5.05 of the General Conditions as may be modified by the Supplementary 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 due to 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 as may be modified by the Supplementary Conditions.

4.05 On request, OWNER will provide Bidder access to the Site to conduct such examinations, investigations, explorations, test, 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.

4.06 Reference is made to Article 8 of the General Conditions, as may be modified by the Supplementary Conditions, for the 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 for which a Bid is to be submitted. 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.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;

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

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

D. carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 5.03 of the General Conditions, and carefully study all reports and drawings of a Hazardous Environmental Condition, if any, at the Site which have been identified in the Supplementary Conditions as provided in paragraph 5.06 of the General Conditions;

E. obtain and carefully study (or assume responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. 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 bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. 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;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. promptly give ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by ENGINEER is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by ENGINEER are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.01 No pre-Bid conference will be scheduled for this Project.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified 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 the CONTRACTOR. 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.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 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 ENGINEER as having received the Bidding Documents. Questions received less than ten (10) days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by OWNER or ENGINEER.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to OWNER in an amount of five (5) percent of Bidder's maximum Bid price and in the form of a Bid Bond on the form attached, and issued by a surety meeting the requirements of paragraphs 6.01 and 6.02 of the General Conditions as may be modified by the Supplementary Conditions.

A. Owner will only accept as valid Bid Bonds issued by sureties licensed and authorized to do business in North Dakota, rated “A-“ or better by A.M. Best Company, Inc.

B. Owner will only accept as valid those Bid Bonds issued by sureties 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.

C. The Underwriting Limitation for a surety must exceed the face amount of each Bid Bond issued by the surety.

8.02 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 fifteen (15) days after Notice of Award, OWNER may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of the three (3) lowest Bidders shall be retained by OWNER until the earlier of seven (7) days after the Effective Date of Agreement or sixty (60) days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of Bidders other than the three (3) lowest Bidders shall be returned within fifteen (15) days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be Substantially Completed and also completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 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-equal", or "approved equivalent" items. Whenever it is specified or described in the Bidding Documents that a substitute, "or-equal", or "approved equivalent" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, Bidder may make application to Engineer for approval of the substitute, "or-equal", or "approved equivalent" material or equipment. Engineer will consider request for approval ONLY if submitted at least fifteen (15) days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment for which it is to be considered as a substitute, "or-equal", or "approved equivalent" and a complete description of the proposed item including drawings, cuts, performance, and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or Work that incorporation of the proposed item would require shall be included. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to OWNER in advance of specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five (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 lists shall be 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. 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, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in the cost occasioned by such substitution, and OWNER may consider such price adjustment in evaluating Bids and making the contract award.

12.02 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 paragraph 7.07 of the General Conditions as may be modified by the Supplementary Conditions.

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

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed. A Bid price shall be indicated for each Contract and Bid item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

13.03 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 Bid shall be attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

13.04 Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature). The official address of the partnership shall be shown below the signature.

13.05 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 must be shown below the signature.

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

13.07 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid form. The official address of the joint venture must be shown below the signature.

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

13.09 The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid form. **Failure to do so may be cause for classifying the Bid as non-responsive and the Bid not being opened.**

13.10 The address and telephone number for communications regarding the Bid shall be shown. If the Bidder has an e-mail address, that e-mail address shall be included for communication purposes.

13.11 A copy of Contractor's License or Certificate of Renewal as issued by the Secretary of State to do business in the State of North Dakota must be enclosed in the bid bond envelope as required under Section 43-07-12. All bids and proposals for the construction of any public contract project subject to the provisions of this chapter shall contain a statement showing that the bidder or contractor is duly and regularly licensed hereunder. The number and class of such license then held by such public contractor shall appear upon such bid or proposal. No contract shall be awarded to any contractor unless he is the holder of a license in the class within which the value of the project shall fall as hereinbefore provided. A contractor must be the holder of a license at least ten days prior to the date set for receiving bids to be a qualified bidder. The bid shall be submitted in a sealed envelope upon which there is disclosed the following information:

- The class of license held by the bidder;
- The number of the bidder's license;
- The name of the person, firm or corporation submitting the bid;
- Date on which license was issued or renewed.

A bid submitted without this information shall not be considered and shall be returned to the bidder.

ARTICLE 14 – BASIS OF BID; EVALUATION OF BIDS

14.01 General

A. The Owner will award a single Prime Contract for the Project as follows:

1. A single contract (Contract No. 1) for all work under the Base Bid No.1, Base Bid No. 2, & Base Bid No. 3 unit price contract or; A single contract (Contract No. 1) for all work under the Base Bid No. 1, Base Bid No. 2, & Base Bid No. 3 unit price contract and any combination of the alternates unit price contracts. Note Alternate No. 3 may be awarded as 'A' option only **or** both 'A' and 'B' options. Base Bids and Alternates with 'B' designation will not be awarded without award of the corresponding 'A' option.
2. Submission of a Bid for the Project signifies Bidder's willingness to enter into a Contract at the prices offered.
3. Bidders offering a Bid for the Project must be capable of completing the Work within the time period(s) stated in the Agreement for the Contract.
4. Bid prices shall include such amounts as the Bidder deems proper for overhead and profit.

5. Bid prices shall include such amounts as the Bidder deems proper for overhead and profit on account of pre-negotiated equipment and/or materials, if any, named in the Contract Documents.

14.02 Unit Price

A. Bidders shall submit a Bid on a unit price basis for contracts established as unit price contracts as set forth in the Bid Form.

B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 13.03 of the General Conditions as may be modified by the Supplementary Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

14.03 Lump Sum – Not Used.

14.04 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in paragraph 13.02 of the General Conditions as may be modified by the Supplementary Conditions.

ARTICLE 15 – SUBMITTAL OF BID

15.01 Each prospective Bidder is furnished one (1) copy of the Bidding Documents with one (1) separate unbound copy each of the Bid form and the Bid Bond form. The unbound copy of the Bid form is to be completed and submitted with the Bid security and other required documents as described in this article.

15.02 Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids. If the Bid is sent through the mail or other delivery system, the sealed envelope and attached Bid security envelope shall be enclosed in a separate sealed envelope, labeled with the notation “Bid Enclosed” on its face and sent to the address below.

15.03 Bidder shall prepare his Bid as follows:

A. Enclose in an opaque sealed envelope:

A. Completed Bid Form.

B. Mark on outside of opaque sealed envelope:

A. “BID ENCLOSED”

B. Greater Ramsey Water District
113 Shamrock Lane SE
Devils Lake, ND 58301

Attn: Geoff Slick

C. BID FOR: GRWD – 2024 User Expansion

D. BID FROM: (Name and address of the Bidder)
Acknowledgement of Receipt of Addenda _____ through _____.
(Fill in appropriate Addendum numbers.)

NOTE: Any Bidder who fails to acknowledge receipt of <u>all</u> Addenda <u>on the outside of the Bid envelope</u> may be considered non-responsive and that Bid will not be opened.

C. Attach to outside of sealed opaque envelope containing bid a separate sealed envelope containing the following completed items:

A. Bid Bond. See Section 00 43 13.

B. Non-Collusion Affidavit. See Section 00 45 19.

C. Contractor's License or Certificate of Renewal, for the full amount of the Bid, as required by N.D.C.C. § 43-07-07, issued by the North Dakota Secretary of State, valid and dated at least 10 days prior to Bid opening.

Note: Any Bidder who fails to include <u>all forms</u> indicated above within the <u>Bid Bond envelope</u> shall be considered non-responsive and that Bid will not be opened.

D. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid and the associated attached Bid Security envelope shall be enclosed in a separate envelope, plainly marked on the outside with the notation "BID ENCLOSED."

E. A mailed Bid shall be addressed to:

AE2S
Attn: Geoff Slick, PE
4050 Garden View Drive Suite 200
Grand Forks, ND 58201

15.04 The lowest, responsible Contractor(s) shall submit the following forms within 10 days after the Bid to the Engineer.

A. Bidder Qualifications Form. See Section 00 43 29.

B. Contractor Dispute History Certification. See Section 00 45 12.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the 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.

16.02 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 the Bid, and the Bid Bond will be returned. Thereafter, if the Work is re-bid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Bids will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 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 Bid security prior to the end of this period.

ARTICLE 19 – AWARD OF CONTRACT

19.01 OWNER reserves the right to reject any or all Bids **for any reason**. OWNER also reserves the right to waive all informalities and to negotiate contract terms with the Successful Bidder. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

19.02 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 a 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.

19.03 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.

19.04 In evaluating Bidders, OWNER will 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 as provided in the General Conditions as may be modified by the Supplementary Conditions

19.05 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, OWNER will award the Contract to the Bidder whose Bid is in the best interest of the Project.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth OWNER's requirements as to Performance and Payment Bonds and insurance. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by such Bonds and insurance.

ARTICLE 21 – EXECUTION OF AGREEMENT

21.01 When OWNER gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within fifteen (15) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER. Within fifteen (15) days thereafter, OWNER shall deliver one (1) fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

21.02 A performance bond and payment bond, each in the amount of 100 percent of the contract price, with a corporate surety approved by the OWNER, will be required as security for the faithful performance and payment of obligation under the Agreement. Attorneys-in-fact who sign the performance and payment bonds must file with each bond a certified and effective dated copy of their power of attorney.

21.03 In the event of the Bidder failing to execute the Agreement, the OWNER may at their option consider the Bidder in default, in which case the certified check, bank check, or Bid Bond accompanying the Bid shall become property of the OWNER.

21.04 Within thirty (30) days after receipt of acceptable performance and payment bonds and the Agreement signed by the Successful Bidder, OWNER shall sign the Agreement and return to the Successful Bidder an executed duplicate of the Agreement.

21.05 The Notice to Proceed shall be issued within thirty (30) days of the execution of the Agreement by the OWNER. A preconstruction conference will be held prior to the issuance of the Notice to Proceed. Should there be any reason why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the Notice to Proceed has not been issued within thirty (30) days of the execution of the Agreement or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

ARTICLE 22 – SALES AND USE TAXES

22.01 OWNER is not exempt from State of North Dakota state sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes shall be included in the Bid.

ARTICLE 23 – RETAINAGE

23.01 Retention of CONTRACTOR's securities in lieu of retainage is not acceptable; provisions concerning retainage are set forth in the Agreement.

ARTICLE 24 – EXECUTIVE ORDER

24.01 The Successful Bidder shall comply with all requirements of Executive Order No. 11246 regarding non-discrimination in employment and shall incorporate the same in all subcontracts over $10,000. An excerpt from Executive Order No. 11246 has been provided for reference in the Project Manual.

ARTICLE 25 – EQUAL OPPORTUNITY REQUIREMENTS

25.01 The Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Bidder will take affirmative action to ensure that applicants are employed and that employees are treated during employment, without regard to race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

25.02 The Bidder will, in all solicitation or advertisements for employees placed by or on behalf of the Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

25.03 The Bidder will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Bidder's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

25.04 The Bidder will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

25.05 The Bidder will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

25.06 In the event of the Bidder's non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Bidder may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965 or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

25.07 The Bidder will include the provisions of paragraphs as above stated in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Bidder will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, That in the event the Bidder becomes involved in or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Bidder may request the United States to enter into such litigation to protect the interests of the United States.

END OF SECTION

PROCUREMENT FORMS AND SUPPLEMENTS

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SECTION 00 41 00 – BID FORM

PROJECT IDENTIFICATION: GRWD – 2024 User Expansion
Greater Ramsey Water District
Devils Lake, ND

CONTRACT NUMBER AND IDENTIFICATION:

Contract No. 1 – Pipeline Construction

THIS BID IS SUBMITTED TO: Greater Ramsey Water District
113 Shamrock Lane SE
Devils Lake, ND 58301

ARTICLE 1 – BID RECIPIENT

1.01 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.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS:

2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitation those dealing with the dispositions of Bid security. The Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening, or for such longer time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDERS'S REPRESENTATIONS:

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. 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:

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____

B. 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.

C. Bidder 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.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-5.03 of the Supplementary Conditions and as provided in paragraph 5.03 of the General Conditions; and (2) reports and drawings of a Hazardous Environmental Condition, if any, which has been identified in SC-5.06 of the Supplementary Conditions and as provided in paragraph 5.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site which may affect cost, progress or performance of the Work or which relate to any aspect of 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 to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any 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 and in accordance with other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of Work to be performed by Owner and others at the Site that relates to Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

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

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

ARTICLE 4 – FURTHER REPRESENTATIONS:

4.01 Bidder further represents that 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 agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

ARTICLE 5 – BASIS OF BID:

5.01 Bidder will complete the Work, whether specifically listed on the BID FORM, shown on the Drawings, described in the Specifications, or described in Addendum in accordance with the Contract Documents for the following price(s):

BASE BID NO. 1: USER EXPANSION

ITEM	ITEM DESCRIPTION	QTY.	UNIT	UNIT PRICE	EXTENDED PRICE
A.	Mobilization	1	l.s.	$ _____	$ _____
B.	Water Main				
	1. 2-inch DR 11 IPS Poly	420,000	l.f.	$ _____	$ _____
	2. 3-inch DR 11 IPS Poly	4,000	l.f.	$ _____	$ _____
C.	Directional Bores *(includes pipe & couplers)*				
	1. 2-inch DR 11 IPS Poly	52,000	l.f.	$ _____	$ _____
	2. 3-inch DR 11 IPS Poly	400	l.f.	$ _____	$ _____
D.	Cased Bores *(includes pipe & couplers)*			_____	_____
	1. 2-inch RR and Hwy 2 Crossing (125' of 4" steel casing pipe and 600' of 2" DR 11 IPS Poly carrier pipe)	1	ea.	$ _____	$ _____
E.	Fittings *(In-line w/ New Pipeline; includes couplers, reducers and fusing)*				
	1. 2-inch Poly Tee	29	ea.	$ _____	$ _____
	2. 3-inch Poly Tee	4	ea.	$ _____	$ _____
	3. 3-inch by 2-inch Poly Reducer	3	ea.	$ _____	$ _____
F.	Tie-In to Existing System *(includes couplers, reducers, tees, saddles, tees and fusing)*				
	1. New 2-inch to Ex. 1-inch through 3-inch	59	ea.	$ _____	$ _____
	2. New 2-inch to Ex. 3.5-inch through 16-inch	32	ea.	$ _____	$ _____
	3. New 3-inch to Ex. 3-inch through 16-inch	3	ea.	$ _____	$ _____
G.	2-inch Gate Valve	22	ea.	$ _____	$ _____
H.	3-inch Gate Valve	3	ea.	$ _____	$ _____
I.	1-inch Residential Curb Stop Valve	124	ea.	$ _____	$ _____
J.	Residential Meter Setter Unit	86	ea.	$ _____	$ _____
K.	Frost Proof Meter Pit	38	ea.	$ _____	$ _____
L.	2-inch PRV Manhole	1	ea.	$ _____	$ _____
M.	Seeding	50	acre	$ _____	$ _____

N.	Gravel	500	ton	$		$	
O.	Restoration	424,000	l.f.	$	0.50	$	212,000
P.	Pavement Repair & Patching	100	s.y.	$		$	

SUBTOTAL BASE BID NO. 1: USER EXPANSION PIPELINE CONSTRUCTION: **($) (Use Figures)**

BASE BID NO. 2: HIGHWAY 19 EXPANSION (POLY)

ITEM	ITEM DESCRIPTION	QTY.	UNIT		UNIT PRICE		EXTENDED PRICE
A.	Mobilization	1	l.s.	$		$	
B.	Water Main						
	1. 2-inch DR 11 IPS Poly	200	l.f.	$		$	
	2. 8-inch DR 13.5 IPS Poly	100	l.f.	$		$	
	3. 12-inch DR 17 IPS Poly	15,000	l.f.	$		$	
C.	Directional Bores *(includes pipe & couplers)*						
	1. 12-inch DR 17 IPS Poly	2,575	l.f.	$		$	
D.	Fittings *(In-line w/ New Pipeline; includes couplers, reducers and fusing)*						
	1. 12-inch 90° Poly Bend	1	ea.	$		$	
	2. 12-inch 45° Poly Bend	4	ea.	$		$	
	3. 12-inch Poly Tee	1	ea.	$		$	
E.	Tie-In to Existing System *(includes couplers, reducers, tees, saddles, tees and fusing)*						
	1. West Tie-in	1	l.s.	$		$	
	2. North Tie-in	1	l.s.	$		$	
	3. East Tie-in	1	l.s.	$		$	
	4.New 12-inch to Existing 1-inch through 3-inch	1	ea.	$		$	
F.	Gate Valves						
	1. 8-inch	2	ea.	$		$	
	2. 12-inch	2	ea.	$		$	
G.	1-inch Flush/Air Blow-off Valve	1	ea.	$		$	
H.	Seeding	5	acre	$		$	
I.	Gravel	100	ton	$		$	
J.	Restoration	15,000	l.f.	$	0.50	$	7,500.00

SUBTOTAL BASE BID NO. 2: HIGHWAY 19 EXPANSION (POLY) PIPELINE CONSTRUCTION: **($) (Use Figures)**

BASE BID NO. 3: WEBSTER CONNECTION

ITEM	ITEM DESCRIPTION	QTY.	UNIT	UNIT PRICE	EXTENDED PRICE
A.	Mobilization	1	l.s.	$ _____	$ _____
B.	Water Main				
	1. 2-inch DR 11 IPS Poly	100	l.f.	$ _____	$ _____
	2. 6-inch DR 17 IPS Poly	100	l.f.	$ _____	$ _____
C.	Directional Bores *(includes pipe & couplers)*				
	1. 6-inch DR 17 IPS Poly	200	l.f.	$ _____	$ _____
D.	Tie-In to Existing System *(includes couplers, reducers, tees, saddles, tees and fusing)*				
	1. Webster Vault Connection	1	ea.	$ _____	$ _____
	2. New 6-inch to Ex. 16-inch	1	ea.	$ _____	$ _____
E.	Gate Valves				
	1. 2-inch	1	ea.	$ _____	$ _____
	2. 6-inch	1	ea.	$ _____	$ _____
F.	1-inch Flush/Air Blow-off Valve	1	ea.	$ _____	$ _____
G.	Seeding	1	acre	$ _____	$ _____
H.	Gravel	100	ton	$ _____	$ _____
I.	Webster PRV Manhole	1	l.s.	$ _____	$ _____
J.	Webster Manhole Electrical, Instrumentation, and Controls	1	l.s.	$ _____	$ _____

SUBTOTAL BASE BID NO. 3: WEBSTER CONNECTION PIPELINE CONSTRUCTION: **($ _____)**
(Use Figures)

ALTERNATE NO. 1: HIGHWAY 19 EXPANSION (PVC)

ITEM	ITEM DESCRIPTION	QTY.	UNIT	UNIT PRICE	EXTENDED PRICE
A.	Incremental cost **increase** or **decrease** (circle one) for 12-inch SDR26 CL 160 IPS PVC pipeline in lieu of 12-inch DR 17 IPS POLY pipeline included as Work within Base Bid 2 – Highway 19 Expansion (Poly).	15,000	l.f.	$ _____	$ _____

SUBTOTAL ALTERNATE NO. 1: HIGHWAY 19 EXPANSION (PVC) PIPELINE CONSTRUCTION: **($ _____)**
(Use Figures)

ALTERNATE NO. 2: WEBSTER TRANSMISSION EXPANSION

ITEM	ITEM DESCRIPTION	QTY.	UNIT	UNIT PRICE	EXTENDED PRICE
A.	Mobilization	1	l.s.	$	$
B.	Water Main				
	1. 2-inch DR 11 IPS Poly	400	l.f.	$	$
	2. 4-inch DR 11 IPS Poly	21,500	l.f.	$	$
C.	Directional Bores *(includes pipe & couplers)*				
	1. 2-inch DR 11 IPS Poly	100	l.f.	$	$
	2. 4-inch DR 11 IPS Poly	650	l.f.	$	$
D.	Fittings *(In-line w/ New Pipeline; includes couplers, reducers and fusing)*				
	1. 4-inch Poly Tee	1	ea.	$	$
E.	Tie-In to Existing System *(includes couplers, reducers, tees, saddles, tees and fusing)*				
	1. New 4-inch to Ex. 1-inch through 3-inch	8	ea.	$	$
	2. Webster Vault Connection	1	l.s.	$	$
F.	Gate Valves				
	1. 2-inch	5	ea.	$	$
	2. 4-inch	3	ea.	$	$
G.	1-inch Flush/Air Blow-off Valve	1	ea.	$	$
H.	Seeding	5	acre	$	$
I.	Gravel	50	ton	$	$
J.	Restoration	21,900	l.f.	$ **0.50**	$ **10,950.00**

SUBTOTAL ALTERNATE NO. 2: WEBSTER TRANSMISSION EXPANSION PIPELINE CONSTRUCTION: **($) (Use Figures)**

ALTERNATE NO. 3A: SOUTH SYSTEM TRANSMISSION EXPANSION (POLY)

ITEM	ITEM DESCRIPTION	QTY.	UNIT	UNIT PRICE	EXTENDED PRICE
A.	Mobilization	1	l.s.	$	$
B.	Water Main				
	1. 8-inch DR 13.5 IPS Poly	42,500	l.f.	$	$
C.	Directional Bores *(includes pipe & couplers)*				
	1. 8-inch DR 13.5 IPS Poly	2,600	l.f.	$	$

D.	Fittings *(In-line w/ New Pipeline; includes couplers, reducers and fusing)*						
	1. 8-inch 90° Poly Bend	1	ea.	$		$	
	2. 8-inch 45° Poly Bend	5	ea.	$		$	
E.	Tie-In to Existing System *(includes couplers, reducers, tees, saddles, tees and fusing)*						
	1. New 8-inch to Ex. 4-inch through 12-inch	1	ea.	**$**		**$**	
	2. South Booster Connection	1	l.s.	**$**		**$**	
F.	Gate Valves						
	1. 8-inch	5	ea.	**$**		**$**	
G.	1-inch Flush/Air Blow-off Valve	1	ea.	**$**		**$**	
H.	Seeding	10	acre	**$**		**$**	
I.	Gravel	100	ton	**$**		**$**	
J.	Restoration	42,500	l.f.	**$**	**0.50**	**$**	**21,250.00**

SUBTOTAL ALTERNATE NO. 3A: SOUTH SYSTEM TRANSMISSION EXPANSION (POLY) PIPELINE CONSTRUCTION: **($) (Use Figures)**

ALTERNATE NO. 3B: SOUTH SYSTEM TRANSMISSION EXPANSION (PVC)

ITEM	ITEM DESCRIPTION	QTY.	UNIT		UNIT PRICE		EXTENDED PRICE
A.	Incremental cost **increase** or **decrease** (circle one) for 8-inch SDR26 CL 160 IPS PVC pipeline in lieu of 8-inch DR 17 IPS POLY pipeline included as Work within Alternate No. 3A – South System Transmission Expansion (Poly).	42,500	l.f.	**$**		**$**	

SUBTOTAL ALTERNATE NO. 3B: SOUTH SYSTEM TRANSMISSION EXPANSION (PVC) PIPELINE CONSTRUCTION: **($) (Use Figures)**

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees to complete the Work to Substantial Completion and have all Work completed and ready for Final Payment, in accordance with paragraph 15.06.B of the General Conditions on or before the dates indicated below for each Base Bid and Alternate:

1. Contract No. 1
   - a. Base Bid No. 1
     - 1) Zone A
       - A. Substantial Completion – November 15, 2025
       - B. Final Completion – June 15, 2026
     - 2) Zone B
       - A. Substantial Completion – September 30, 2026

B. Final Completion – November 15, 2026

b. Base Bid No. 2
   1) Substantial Completion – October 15, 2025
   2) Final Completion – June 15, 2026

c. Base Bid No. 3
   1) Substantial Completion – August 31, 2025
   2) Final Completion – September 30, 2025

d. Alternate No. 1
   1) Substantial Completion – October 15, 2025
   2) Final Completion – June 15, 2026

e. Alternate No. 2
   1) Substantial Completion – September 30, 2026
   2) Final Completion – November 15, 2026

f. Alternate No. 3 (A and B)
   1) Substantial Completion – September 30, 2026
   2) Final Completion – November 15, 2026

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified above, and to pay Owner the following amounts for each day that expires after the times specified in paragraph 6.01 for Substantial Completion and/or Final Completion for each Project Zone, respectively:

1.	Substantial Completion:	$ 1,000/day
2.	Final Completion:	$ 500/day

ARTICLE 7 – ATTACHMENTS TO THIS BID:

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid Security in the form of a Bid Bond.

B. Non-Collusion Affidavit.

C. Contractor's License or Certificate of Renewal.

ARTICLE 8 – DEFINED TERMS:

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

ARTICLE 9 – BID SUBMITTAL:

Bid submitted on _____, 2025.

9.01 This Bid is submitted by:

An Individual

Name (typed or printed):_____

By:_____
(*Individual's Signature*)

Doing business as:_____

A Partnership

Partnership Name:_____

By:_____
(*Signature of general partner – attach evidence of authority to sign)*

Name (typed or printed):_____

Bid submitted on _____, 2025.

A Corporation

Corporation Name:_____

State of Incorporation:_____

Type (General Business, Profession, Service, Limited Liability):_____

By:_____

(*Signature – attach evidence of authority to sign)*

Name (typed or printed):_____

Title:_____

Attest:_____

(*Signature of Corporate Secretary)*

Date of Qualification to do business in North Dakota is_____/_____/_____.

A Joint Venture

Name of Joint Venture:_____

First Joint Venture Name:_____

By:_____
(*Signature of joint venture partner – attach evidence of authority to sign)*

Name (typed or printed):_____

Title:_____

Second Joint Venture Name:_____

By:_____
(*Signature of joint venture partner – attach evidence of authority to sign)*

Name (typed or printed):_____

Title:_____

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

Bidder's Business address: _____

_____

Business Phone No._____

Business Fax No._____

Business E-Mail Address_____

State Contractor License No._____. (If applicable)

Employer's Tax ID No._____

Phone and FAX Numbers, and Address for receipt of official communications if different from Business contact information:

_____

_____

Bid submitted on _____, 2025.

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BID BOND (PENAL SUM FORM)

Bidder	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Bid**
Name: **Greater Ramsey Water District**	Project *(name and location)*: **GRWD – 2024 User Expansion**
Address *(principal place of business)*: **113 Shamrock Lane SE, Devils Lake, ND 58301**	Bid Due Date: **1-30-2025**
Bond	
Penal Sum: **[Amount]**	
Date of Bond: **[Date]**	

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

Bidder	Surety
_____ *(Full formal name of Bidder)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature) (Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title:	Title:

Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.

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 Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs 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 will 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 of 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 does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will 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 the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must 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 Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will 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 will 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 governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00 43 29 – BIDDER QUALIFICATIONS FORM

The following information is to be submitted to demonstrate that the Bidder meets the experience requirements as indicated in paragraph 3.01.A of the Instruction to Bidders.

Bidder's Name: _____

Relevant Project Experience	
Project Name	
Year Constructed	
Contract Amount ($)	
Project Description	
Project Owner Contact Name and Number	
Project Engineer Contact Name and Number	

Relevant Project Experience	
Project Name	
Year Constructed	
Contract Amount ($)	
Project Description	
Project Owner Contact Name and Number	
Project Engineer Contact Name and Number	

Relevant Project Experience	
Project Name	
Year Constructed	
Contract Amount ($)	
Project Description	
Project Owner Contact Name and Number	
Project Engineer Contact Name and Number	

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CONSTRUCTION CONTRACTOR'S DISPUTE HISTORY CERTIFICATION

Within the last ten years the following construction contracts resulted in Dispute Resolution procedures involving mediation, arbitration, or legal action (If none, indicate "none". Attach additional pages if necessary):

Name, Location and Description of Project	Owner	Engineer	Reference/Contact Include address & Phone	Describe the nature of the Dispute	Describe Dispute Outcome

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief:

By: _____

Title: _____

Dated: _____

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SECTION 00 45 19 – NON-COLLUSION AFFIDAVIT

STATE OF _____

COUNTY OF _____

I hereby swear (affirm) under penalty or perjury:

1. That I am the Bidder (if Bidder is an individual), a partner in the Bidder (if Bidder is a partnership), or an officer or employee of the Bidder (if Bidder is a corporation) having authority to sign on its behalf;

2. That the attached Bid or Bids have been arrived at by the Bidder individually and have been submitted without collusion with, and without any agreement, understanding or planned common course or action with any vendor of materials, suppliers, equipment, or services described in the invitation to bid designed to limit individual bidding or competition;

3. That the contents of this Bid or Bids have not been communicated by Bidder or its employees or agents to any person not an employee or agent of the Bidder or its surety on any bond furnished with the Bid or Bids, and will not be communicated to any such person, prior to any official opening of the Bid or Bids; and

4. That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

_____
Signature of Bidder

Subscribed and sworn before me this

_____ day of _____20___

_____
Position

_____
Notary

_____
Company Name

(seal)

_____
Date

END OF SECTION

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CONTRACTING FORMS AND SUPPLEMENTS

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NOTICE OF AWARD

DATE: _____

TO: _____
(Contractor)

ADDRESS: _____

_____

PROJECT: **GRWD – 2024 User Expansion**

CONTRACT FOR: _____

You are notified that your Bid dated _____ for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a contract for all work under the above referenced project.

The Contract Price of your contract is _____

Four (4) copies of the proposed Agreement accompany this Notice of Award.

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, that is by _____, 2025.

1. You must, immediately, deliver to the ENGINEER four (4) signed copies of this Notice acknowledging its receipt.

2. You must deliver to the ENGINEER four (4) fully executed counterparts of the Agreement including all the Contract Documents.

3. You must deliver with each executed Agreement, Performance and Payment Bonds as specified in the Instructions to Bidders (Article 20), General Conditions (Article 6.01) as may be amended by the Supplementary Conditions.

4. You must deliver with each executed Agreement, Certificates of Insurance as specified in the General Conditions (Article 6) as may be amended by the Supplementary Conditions.

5. You must deliver with each executed Agreement, Current Workmen's Compensation Certificate of Premium Paid.

6. You must deliver with each executed Agreement, Contractor's Certificate of North Dakota Income and Sales Tax Clearance.

After execution of the Agreement, please send all copies of the Contract, along with the above items to the Engineer, **Advanced Engineering and Environmental Services, LLC (AE2S)**, 4050 Garden View Drive, Suite 200, Grand Forks, ND 58201.

Failure to comply with these conditions within the time specified will entitle Owner to consider your bid in default, to annul this Notice of Award, and to declare your Bid Security Forfeited.

Within 15 days after you comply with the above conditions, OWNER will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

Greater Ramsey Water District
Owner

By: _____
Authorized Signature

ACCEPTANCE OF AWARD

_____
Contractor

By: _____

Title: _____

Date: _____

SECTION 00 52 00 – AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ in the year 2025 by and between Greater Ramsey Water District, 113 Shamrock Lane SE, Devils Lake, ND 58301 (hereinafter called OWNER) and_____(hereinafter called CONTRACTOR).

ARTICLE 1 – WORK

1.01 CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

A. *To be filled in per intended Contract (Individual or Combined) accepted and awarded by Owner.*

ARTICLE 2 – THE PROJECT

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

GRWD – 2024 User Expansion
Greater Ramsey Water District
Devils Lake, North Dakota

ARTICLE 3 – THE ENGINEER

3.01 The Project has been designed by Advanced Engineering and Environmental Services, LLC who is hereinafter called ENGINEER and who is to act as OWNER'S representative, assume all 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.

ARTICLE 4 – CONTRACT TIMES

4.01 Time of Essence

A. *All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are the essence of the Contract.*

4.02 Dates to Achieve Substantial Completion and Final Payment

A. The Work within each Base Bid and Alternate will be substantially completed within the following Substantial Completion dates when the Contract Times commence to run as provided in paragraph 4.01 of the General Conditions as may be amended by the Supplementary Conditions, and completed and ready for payment in accordance with paragraph 15.06 of the General Conditions as may be amended by the Supplementary Conditions within the following Final Completion dates:

1. Contract No. 1
   a. Base Bid No. 1
      1) Zone A

A. Substantial Completion – November 15, 2025
B. Final Completion – June 15, 2026
C. 120 Working Days

2) Zone B

A. Substantial Completion – September 30, 2026
B. Final Completion – November 15, 2026
C. 120 Working Days

b. Base Bid No. 2
1) Substantial Completion – October 15, 2025
2) Final Completion – June 15, 2026
3) 30 Working Days

c. Base Bid No. 3
1) Substantial Completion – August 31, 2025
2) Final Completion – September 30, 2025
3) 15 Working Days

d. Alternate No. 1
1) Substantial Completion – October 15, 2025
2) Final Completion – June 15, 2026
3) 30 Working Days

e. Alternate No. 2
1) Substantial Completion – September 30, 2026
2) Final Completion – November 15, 2026
3) 30 Working Days

f. Alternate No. 3 (A and B)
1) Substantial Completion – September 30, 2026
2) Final Completion – November 15, 2026
3) 60 Working Days

B. Substantial Completion is defined as the time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of the 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 of delivering potable water to Owner's customers. In addition, to achieve Substantial Completion of the Work for distribution and transmission pipelines and all associated appurtenances required for a complete and operable installation located in agricultural fields, completed Work shall include top soil replacement, spreading, and cultivation of disturbed field areas to allow full and unhindered use by property owners as agricultural land for seed bed purposes in the spring of the immediately following spring planting season in each respective Base Bid and Alternate. The terms "substantially complete" and "substantially completed" as applied to all or a part of the Work refer to Substantial Completion thereof.

4.03 Liquidated Damages

A. CONTRACTOR and OWNER recognize that time is of essence of the Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions as may be amended by the

Supplementary 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 competed 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 $1,000.00 for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. Additionally, CONTRACTOR shall pay OWNER $500.00 for each day that expires after the time specified in paragraph 4.03 for Interim Milestone Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse, or fail to complete the remaining of the Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER $500.00 for each day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 OWNER shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds to the sum of the amounts determined pursuant to paragraph 5.01.A, below:

A. For all Work (including Base Bid and Owner selected Alternates *(to be identified)*),

(insert Bid Form and Alternates here)

ARTICLE 6 – PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. 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.

6.02 Progress Payments; Retainage

A. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment on a monthly routine basis during performance of the Work as provided in the paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established in paragraph 2.05.A of the General Conditions as may be amended by the Supplementary Conditions:

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, in accordance with paragraph 14.01 of the General Conditions as may be amended by the Supplementary Conditions:

a. 90 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 retainage on account of Work subsequently completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100 percent of the Work completed less the aggregate of payments previously made; and

b. 90 percent of cost of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER with the balance being retainage).

1) Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 95 percent of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 15.01.C of the General Conditions as may be amended by the Supplementary Conditions and less 100 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.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with paragraph 15.06 of the General Conditions as may be amended by the Supplementary Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 15.06 as may be amended.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 15 of the General Conditions as may be amended by the Supplementary Conditions shall bear interest at the maximum rate allowed by law at the place of the Project.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

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

C. CONTRACTOR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance for the Work.

D. CONTRACTOR has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 5.03 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 5.06 of the General Conditions.

E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of the construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contact Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto

F. CONTRACTOR does not consider that any further examinations, investigations, explorations, test, 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.

G. 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.

H. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

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

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:
   1. This Agreement (pages 1 to 8, inclusive);
   2. Performance Bond;

3. Payment Bond;
4. General Conditions (pages 1 to 77 inclusive);
5. Supplementary Conditions (pages 1 to 29, inclusive);
6. Specifications as listed in the table of contents of the Project Manual;
7. Drawings consisting of one volume with cover sheets titled "GRWD – 2024 USER EXPANSION" with each sheet bearing the following general title: GRWD – 2024 USER EXPANSION, GREATER RAMSEY WATER DISTRICT;
8. Addenda (numbers _____ to _____, inclusive);
9. Notice of Award;
10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    a. Notice to Proceed;
    b. Written Amendments;
    c. Work Change Directives;
    d. Change Order(s).

B. The documents listed in paragraphs 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 11.01 of the General Conditions as may be amended by the Supplementary Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings indicated in the General Conditions and Supplementary Conditions.

10.02 Assignment of Contract

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

10.03 Successors and Assigns

A. 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.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions

shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that 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.

10.05 Contractor's Certifications

A. 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 10.05:

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 the Contract execution;

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 prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

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, non-competitive levels; and

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 duplicate. One (1) counterpart each has been delivered to OWNER and CONTRACTOR. 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 _____(which is the Effective Date of the Agreement).

OWNER:	CONTRACTOR:
_____	_____
By: _____	By: _____
Attest: _____	Attest: _____
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
Designated Representative:	Designated Representative:
Name: _____	Name: _____
Title: _____	Title: _____
Address: _____	Address: _____
_____	_____
Phone: _____	Phone: _____
Facsimile: _____	Facsimile: _____
E-mail: _____	E-mail: _____

END OF SECTION

SECTION 00 55 00 – NOTICE TO PROCEED

DATE: _____

TO: _____
(Contractor)

ADDRESS: _____

_____

PROJECT: **GRWD – 2024 USER EXPANSION**

CONTRACT FOR: _____

You are hereby notified to commence **WORK** in accordance with the Agreement dated _____. You are to have all **WORK** completed and ready for final payment per the agreement.

GREATER RAMSEY WATER DISTRICT
(Owner)

By: _____
(Authorized Signature)

_____
(Title)

ACCEPTANCE OF NOTICE:
Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

_____
(Contractor)

_____
(Authorized Signature)

_____
(Title)

Date: _____, 2025

Copy to ENGINEER
FRM (Use Certified Mail, Return Receipt Requested)

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PROJECT FORMS

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PERFORMANCE BOND

Contractor Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: **Greater Ramsey Water District** Mailing address *(principal place of business)*: **113 Shamrock Lane SE, Devils Lake, ND 58301**	**Contract** Description *(name and location)*: **GRWD – 2024 User Expansion** Contract Price: Effective Date of Contract:

Bond

Bond Amount: **[Amount]**

Date of Bond: **[Date]**

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:

    3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;

    3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

    3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

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

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

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

    5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

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

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

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

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

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

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

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

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the 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 periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

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

    14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

    14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

    14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows: **None.**

PAYMENT BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name: **Greater Ramsey Water District**	Description *(name and location)*:
Mailing address *(principal place of business)*:	
113 Shamrock Lane SE, Devils Lake, ND 58301	
	Contract Price:
	Effective Date of Contract:

Bond

Bond Amount: **[Amount]**

Date of Bond: **[Date]**

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____	_____
(Full formal name of Contractor)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature)(Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

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

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond will arise after the following:

    5.1. Claimants who do not have a direct contract with the Contractor

        5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2. Pay or arrange for payment of any undisputed amounts.

    7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

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

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

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

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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 will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

    16.1. *Claim*—A written statement by the Claimant including at a minimum:

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

        16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;

        16.1.4. A brief description of the labor, materials, or equipment furnished;

16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows: **None.**

Contractor's Application for Payment

Owner:		**Owner's Project No.:**	
Engineer:		**Engineer's Project No.:**	
Contractor:		**Contractor's Project No.:**	
Project:			
Contract:			
Application No.:		**Application Date:**	
Application Period:	**From**	**to**	

1. Original Contract Price				$ -
2. Net change by Change Orders				$ -
3. Current Contract Price (Line 1 + Line 2)				$ -
4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total)				$ -
5. Retainage				
a.	X	$ -	Work Completed	$ -
b.	X	$ -	Stored Materials	$ -
c. Total Retainage (Line 5.a + Line 5.b)				$ -
6. Amount eligible to date (Line 4 - Line 5.c)				$ -
7. Less previous payments (Line 6 from prior application)				
8. Amount due this application				$ -
9. Balance to finish, including retainage (Line 3 - Line 4)				$ -

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:

(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;

(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor:

Signature: **Date:**

Recommended by Engineer		**Approved by Owner**	
By:		**By:**	
Title:		**Title:**	
Date:		**Date:**	
Approved by Funding Agency			
By:		**By:**	
Title:		**Title:**	
Date:		**Date:**	

Progress Estimate - Lump Sum Work

Contractor's Application for Payment

Owner:		**Owner's Project No.:**	
Engineer:		**Engineer's Project No.:**	
Contractor:		**Contractor's Project No.:**	
Project:			
Contract:			

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I
			Work Completed					
Item No.	Description	Scheduled Value ($)	(D + E) From Previous Application ($)	This Period ($)	Materials Currently Stored (not in D or E) ($)	Work Completed and Materials Stored to Date (D + E + F) ($)	% of Scheduled Value (G / C) (%)	Balance to Finish (C - G) ($)
Original Contract								
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
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						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
	Original Contract Totals	$ -	$ -	$ -	$ -	$ -		$ -

Progress Estimate - Lump Sum Work

Contractor's Application for Payment

Owner:		**Owner's Project No.:**	
Engineer:		**Engineer's Project No.:**	
Contractor:		**Contractor's Project No.:**	
Project:			
Contract:			

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I
			Work Completed					
Item No.	Description	Scheduled Value ($)	(D + E) From Previous Application ($)	This Period ($)	Materials Currently Stored (not in D or E) ($)	Work Completed and Materials Stored to Date (D + E + F) ($)	% of Scheduled Value (G / C) (%)	Balance to Finish (C - G) ($)
Change Orders								
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
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						-		-
						-		-
						-		-
						-		-
						-		-
						-		-
	Change Order Totals	$ -	$ -	$ -	$ -	$ -		$ -
Original Contract and Change Orders								
	Project Totals	$ -	$ -	$ -	$ -	$ -		$ -

Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner:	
Engineer:	
Contractor:	
Project:	
Contract:	

Owner's Project No.:	
Engineer's Project No.:	
Contractor's Project No.:	

Application No.: ______ **Application Period:** From ______ to ______ **Application Date:** ______

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
					Original Contract						
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
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					-		-		-		-
					-		-		-		-
					-		-		-		-
				Original Contract Totals	$ -		$ -	$ -	$ -		$ -

Progress Estimate - Unit Price Work | **Contractor's Application for Payment**

Owner: ______________________ Owner's Project No.: __________

Engineer: ______________________ Engineer's Project No.: __________

Contractor: ______________________ Contractor's Project No.: __________

Project: ______________________

Contract: ______________________

Application No.: __________ Application Period: From __________ to __________ Application Date: __________

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
					Change Orders						
					-		-		-		-
					-		-		-		-
					-		-		-		-
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					-		-		-		-
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					-		-		-		-
				Change Order Totals	$ -		$ -	$ -	$ -		$ -
					Original Contract and Change Orders						
				Project Totals	$ -		$ -	$ -	$ -		$ -

Stored Materials Summary **Contractor's Application for Payment**

Owner:		**Owner's Project No.:**	
Engineer:		**Engineer's Project No.:**	
Contractor:		**Contractor's Project No.:**	
Project:			
Contract:			

Application No.: ______ **Application Period:** From ______ to ______ **Application Date:** ______

A	B	C	D	E	F	G	H	I	J	K	L	M
						Materials Stored			Incorporated in Work			
Item No. (Lump Sum Tab) or Bid Item No. (Unit Price Tab)	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Description of Materials or Equipment Stored	Storage Location	Application No. When Materials Placed in Storage	Previous Amount Stored ($)	Amount Stored this Period ($)	Amount Stored to Date (G+H) ($)	Amount Previously Incorporated in the Work ($)	Amount Incorporated in the Work this Period ($)	Total Amount Incorporated in the Work (J+K) ($)	Materials Remaining in Storage (I-L) ($)
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
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								-			-	-
								-			-	-
								-			-	-
					Totals	$ -	$ -	$ -	$ -	$ -	$ -	$ -

REQUEST FOR INFORMATION

Submitted to:	**Advanced Engineering and Environmental Services, LLC** 4050 Garden View Drive, Suite 200 Grand Forks, ND 58201

Date:	
From:	
Attention To:	
Tel/Fax:	
CC:	
RFI #:	
RFI Subject:	
Spec. Referenced:	
Project:	2024 User Expansion
AE2S Project #:	P04013-2023-001

Information Requested:

Response:

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WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]

Owner:	Owner's Project No.:
Engineer:	Engineer's Project No.:
Contractor:	Contractor's Project No.:
Project:	
Contract Name:	
Date Issued:	Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

[Description of the change to the Work]

Attachments:

[List documents related to the change to the Work]

Purpose for the Work Change Directive:

[Describe the purpose for the change to the Work]

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

Notes to User—Check one or both of the following

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: $ _____ **[increase] [decrease] [not yet estimated]**.

Contract Time: _____ days **[increase] [decrease] [not yet estimated]**.

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

	Recommended by Engineer	Authorized by Owner
By:		
Title:		
Date:		

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CHANGE ORDER NO.: [Number of Change Order]

Owner: Owner's Project No.:
Engineer: Engineer's Project No.:
Contractor: Contractor's Project No.:
Project:
Contract Name:
Date Issued: Effective Date of Change Order:

The Contract is modified as follows upon execution of this Change Order:

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	**Change in Contract Times [State Contract Times as either a specific date or a number of days]**
Original Contract Price: $ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. **[Number of previous Change Order]**: $ _____	**[Increase] [Decrease]** from previously approved Change Orders No.1 to No. **[Number of previous Change Order]**: Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: $ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: $ _____	**[Increase] [Decrease]** this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: $ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

Recommended by Engineer (if required)	Accepted by Contractor
By: _____	_____
Title: _____	_____
Date: _____	_____
Authorized by Owner	Approved by Funding Agency (if applicable)
By: _____	_____
Title: _____	_____
Date: _____	_____

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CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE _____

OWNER Greater Ramsey Water District
CONTRACTOR _____
Contract: _____
Project: 2024 User Expansion

OWNER's Contract No. _____ ENGINEER's Project No. _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To Greater Ramsey Water District
OWNER

And To _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

OWNER:_____

_____

_____

CONTRACTOR:_____

_____

_____

_____

The following documents are attached to and made a part of this Certificate:

[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____
Date

_____
ENGINEER

By: _____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on _____
Date

_____
CONTRACTOR

By: _____
(Authorized Signature)

OWNER accepts this Certificate of Substantial Completion on _____
Date

Greater Ramsey Water District_____
OWNER

By: _____
(Authorized Signature)

FINAL INSPECTION AND ACCEPTANCE
00 65 19

Contractor: _____

Address: _____

Project: GRWD – 2024 User Expansion

On this date, _____, 20__, a final inspection of the project as constructed has been made.

The Contractor hereby certifies that the construction has been performed in accordance with the plans and specifications, approved Change Orders, and terms of the contract. The Contractor further certifies that there are no unpaid bills or labor disputes in connection with this contract and that the amount of $_____ shown on the final estimate is the total amount due him for all Work completed for the project.

The Owner does hereby agree that all construction and engineering Work on the project is complete and does satisfy all terms of appropriate construction or engineering agreements.

The Project Engineer has observed the construction and to the best of his knowledge the construction has been performed in accordance with the plans, specifications, approved change orders, and terms of the contract and that the facility has been inspected and approved by all agencies having jurisdiction.

Owner and Contractor do hereby acknowledge that the one year warranty period will begin on _____, 20___.

The undersigned give approval of acceptance of the Work construction under the conditions and guarantee of the contract.

Advanced Engineering and Environmental Services, LLC (AE2S)
Project Engineer

By: _____

Date: _____

Greater Ramsey Water District
Owner

By: _____

Date: _____

_____
Contractor

By: _____

Date: _____

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CONDITIONS
OF THE CONTRACT

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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 document prepared by Contractor, in a form acceptable to Engineer, to request 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 Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off 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; 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.

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.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. 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), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations 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 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. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *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.

24. *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.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

27. *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.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *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.

30. *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.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *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.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

34. *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.

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *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.

37. *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.

38. *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 or areas furnished by Owner which are designated for the use of Contractor.

39. *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.

40. *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.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *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" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *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.

50. *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 Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: 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*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. 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 Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means 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, means 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, means 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. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known 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 Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), 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 signed 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 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 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents 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 Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document 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 versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will 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.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. 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.

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, means 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.

2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer 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 or Engineer 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*

1. *Contractor's Verification of Figures and 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 applicable field measurements. 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 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 or Regulation, (b) actual field conditions, (c) any standard 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 by Engineer, or by an amendment or supplement to the Contract 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 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

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing 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.

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 notify Owner and Contractor in writing 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 versions, 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 precludes 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 30th 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 60th day after the day of Bid opening or the 30th 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 may 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 must 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 will 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 Contract Price or 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. Such an adjustment will 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 third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price 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. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. 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, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses 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.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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*

1. Contractor shall confine construction 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, or to improvements, structures, utilities, or similar facilities located at such adjacent lands 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.

2. If a damage or injury claim is made by 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 which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, 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 in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, 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 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 will 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 of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: 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 Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: 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;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. 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:

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;

2. is of such a nature as to require a change in the Drawings or Specifications;

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.

B. *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 whether it is necessary for Owner to obtain 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; 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. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, 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 subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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;

b. The existence of such condition 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 by 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 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, then any such adjustment will 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, 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.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. 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 on the Drawings, or was not shown or indicated on the Drawings 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), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; 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

4. 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. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, 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. 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;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. 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, then any such adjustment will 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, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; 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 on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. 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;

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 a Hazardous Environmental 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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, 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. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

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, 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.I obligates 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 obligates 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*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year 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 terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, 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 must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. 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.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

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. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages 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 policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. 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, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. 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.

H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain 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.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) 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 will be adjusted accordingly.

L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, 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 and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, 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;

4. apply with respect to the performance of the Work, whether such performance is 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; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other 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 Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If 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 advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. 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 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer 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.

1. 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, risks, 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 individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater 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.
2. None of the above waivers extends 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. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, 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, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. 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 all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 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 6.04 shall maintain such proceeds in a segregated account, and 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, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *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 maintain good discipline and order at the Site.

B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. 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 will 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.

7.04 *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 must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, 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 equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) 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;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item 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 "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material 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 equipment or material under the circumstances described below. To the extent possible such requests must 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 equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.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 equipment or material that Contractor seeks to furnish or use. The application:

    a. will 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 the item specified; and

        3) be suited to the same use as the item 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

        3) 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 the item specified; and

        2) available engineering, sales, maintenance, repair, and replacement services.

    d. will 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.

B. *Engineer's Evaluation and Determination*: 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.

F. *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 will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers 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 or Supplier 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 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. 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 or Suppliers 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 or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, 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 or Supplier, whether initially or as a replacement, will 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 solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed 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 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 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.

7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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.

7.10 *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.

7.11 *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. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any 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 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 such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written 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 written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *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.

7.13 *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.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. 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.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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).

E. 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.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that 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.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. 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.

I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will 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.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) 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

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must 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 Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings must 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.C.

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.C.

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. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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 will 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 or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 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, will 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 or Sample will 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.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

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.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

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 is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, 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.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

2. Recommendation by Engineer or payment by Owner of any progress or final payment;

3. 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. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

E. 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 will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and 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 losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 any 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 will 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.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

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

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

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 third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. 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.

E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

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 for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, 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. 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 will 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, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will 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 or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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.

1. 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 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 8.03.B.

2. 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 Contractor.

C. If Contractor damages, delays, disrupts, or 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 will 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 (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*

A. Engineer will make visits to the Site at 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 10.07. 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 *Resident 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 the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *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.

10.06 *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.

10.07 *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, will 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.

D. Engineer's review of the final Application for 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 Contractor under 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 10.07 also apply to the Resident Project Representative, if any.

10.08 *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 of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that 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, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in 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 11.05, (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 that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. A Work 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 11.07 regarding change of Contract Price.

B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. 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.

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

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work 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 must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates 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.

11.06 *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.C.2.

11.07 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must 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);

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 11.07.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 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 will be 15 percent;

b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;

c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.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 5 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 will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

d. No fee will 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 of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and

f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: 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.

    a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

    b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

    The supporting data must 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.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must 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.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *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 in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *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 are subject 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;

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; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a 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 rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, 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 will 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 will 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 will 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 will 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 will 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 will 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 will be incorporated in a Change Order or other written document 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. When needed 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 will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, 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, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to 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, which 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 will 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 or retained for services specifically related to the Work.

5. Other costs consisting of 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, 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.

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will 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 does not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general 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 agreed upon schedule 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. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

5. 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.

6. Expenses incurred in preparing and advancing Claims.

7. 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*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

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 for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will 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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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 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 with such procedures and programs 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 will 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 will 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 will 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 written 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*

A. If, instead of requiring correction or removal 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 will 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 additional 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, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and 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, 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 will 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 defective Work as required by Engineer, then Owner may, after 7 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 for 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*

1. At least 20 days before the date 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.

2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) 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.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after 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 Contractor indicating in 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;

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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:

    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from 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 has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. 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; or

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the 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 will 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 will be treated as an amount due as determined by Paragraph 15.01.D.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 7 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 will 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 7 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 intended purpose 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 15.03.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 6.04 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 Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must 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 duly pending Change Proposals and Claims; 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.

3. In lieu of the releases or waivers of Liens 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 Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation 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 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will 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. 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. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *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 and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

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 as a Claim, 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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect 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 adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, 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 from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with 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 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. 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.

E. 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.

F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to 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*

A. At any time and without cause, Owner may 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 directly attributable to any such suspension. Any Change Proposal seeking such adjustments must 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) 10 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) written 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 7 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 will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 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 for any loss of anticipated profits or revenue, post-termination overhead costs, 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 7 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, 7 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, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise 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;

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 requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

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*

A. The duties and obligations imposed by these 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 will not constitute a waiver of that provision, nor will 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 of the Contract or 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 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

NSPE®
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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Improving Project Delivery

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

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—for example, “Paragraph SC-4.05.”

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

SC-1.01 Delete Paragraph 1.01.A.42 in its entirety and insert the following in its place:

42. *Substantial Completion* – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of the 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. In addition, to achieve Substantial Completion of the Work for distribution and transmission pipelines and all associated appurtenances required for a complete and operable installation located in agricultural fields, completed Work shall include top soil replacement, spreading, and cultivation of disturbed field areas to allow full and unhindered use by property owners as agricultural land for seed bed purposes in the spring of the immediately following spring planting season in each respective project zone. The terms “substantially complete” and “substantially completed” as applied to all or a part of the Work refer to Substantial Completion thereof.

1.02 *Terminology*

SC-1.02 Amend Paragraph 1.02.A at the end of the paragraph to add the following language:

Other terms used repeatedly in the Supplementary Conditions may be referenced in Paragraph 1.02.

SC-1.02 Amend Paragraph 1.02.C at the end of the paragraph to add the following language:

Note that Paragraph 1.02.C provides that the word “day” means a calendar day. An intended or inadvertent change to “working” day has ramifications throughout the documents and is not intended as a substitute for calendar days unless specifically agreed to, in writing, by the Owner.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

B. *Evidence of Contractor's Insurance:* Before any Work at the Site is started, Contractor shall deliver to the Owner, with copies to each additional insured identified in the Supplementary Conditions, if any, certificates of insurance, endorsements, certified copies of insurance policies, (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor is required to purchase and maintain in accordance with Article 6.

2.02 *Copies of Documents*

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

A. Owner shall furnish to Contractor up to three (3) printed copies of conformed Contract Documents (Project Manual and 11x17 Drawings) incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction. Full sized (22-inch x 34-inch) sets of the Construction Drawings will be furnished at the cost of printing, which shall include labor and materials within the cost of reproduction.

2.03 *Before Starting Construction*

SC-2.03 Add the following information immediately after Paragraph 2.03.A.3:

4. revise the schedule as requested by the Owner's Representative when:

    a. Work progress falls 10 percent behind scheduled progress.
    b. When time extensions are approved for changes and causes beyond Contractor's control.
    c. When Contractor feels a significant reorganization of activities becomes necessary as a result of field and material supply conditions in order to meet the contract completion date of the Project.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

SC-2.04 Delete Paragraph 2.04.A in its entirety and insert the following new paragraph in its place:

A. Before any Work at the Site is started, a preconstruction conference will be held at a mutually agreed upon time and place to establish a working understanding among the parties as to the Work and to discuss the status of Contractor's insurance and bonds schedules referred to in Article 6, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, critical Work sequencing, field decisions and change orders, material deliveries, use of easements, Contractor's assignments for safety and first aid, daily report forms, and maintaining required records. The conference shall be attended by the Owner, Contractor's Project Manager, Contractor's Superintendent, Contractor's Subcontractors as the Contractor deems appropriate, Engineer, Engineer's Resident Project Representative, Governmental representatives, as appropriate, and others as requested by Contractor, Owner, and Engineer. The Engineer/Owner will preside at the preconstruction

conference and will arrange for keeping and distributing the minutes to all persons in attendance. Contractor shall bring to the preconstruction conference submittals in accordance with specifications.

2.06 *Electronic Transmittals*

SC-2.06 Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

B. *Electronic Documents Protocol:* The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol ("EDP" or "Protocol") for exchange of electronic transmittals.

1. *Basic Requirements*

a. To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.

b. The contents of the information in any Electronic Document will be the responsibility of the transmitting party.

c. Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.

d. Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.

e. When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.

f. Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.

2. *System Infrastructure for Electronic Document Exchange*

a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of

minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.

1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is **10** MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.

2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.

b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

c. Each party will operate and maintain industry-standard, industry-accepted, ISO-standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.

d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.

e. Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.

f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.

g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.

h. The Engineer will operate a Project information management system (also referred to in this EDP as "Newforma") for use of Owner, Engineer, and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this EDP or the General Conditions, use of Newforma by the parties as described in this Paragraph will be mandatory for exchange of Project submittals, requests for information (RFIs), and other Project-related information.

SC-2.06 Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:

D. *Requests by Contractor for Electronic Documents in Other Formats*

1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.

2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:

a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.

b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.

c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's use, adaptation, or distribution of any Electronic Documents provided under the Request.

d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.

3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor-requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

H. The provisions of the Instructions to Bidders and Supplementary Conditions shall take precedence over the General Conditions. In the case of conflict, ambiguity, or discrepancy between Drawings and Specifications, or otherwise within the Contract Documents, the better quality or greater quantity of Work resulting in the greater cost shall be furnished and included in the Contract Price and the matter shall be brought to the Engineer's attention for resolution.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

SC-4.01 Delete Paragraph 4.01.A in its entirety and insert the following new paragraph in its place:

A. The Contract Times will commence to run 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 Agreement.

4.03 *Reference Points*

SC-4.03 Add the following new paragraph immediately after Paragraph 4.03.A:

B. Reference points shall be provided by the Engineer one (1) time. Subsequent reestablishment of reference points shall be the responsibility of the Contractor. Contractor shall notify the Engineer a minimum of three (3) days in advance of the need for construction reference points for the Project. All other layout and staking shall be the responsibility of the Contractor.

SC-4.05 Amend Paragraph 4.05.C by adding the following subparagraphs:

5. *Weather-Related Delays*

a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract

Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal in areas within which Work was actively being performed in Ramsey, Nelson, Benson, Eddy, Foster, Stutsman, or Wells Counties, North Dakota, for the period of time in which the delay occurred; 2) that such weather conditions could not have been reasonably anticipated in Ramsey, Nelson, Benson, Eddy, Foster, Stutsman, or Wells Counties, North Dakota, North Dakota; and 3) that such weather conditions had an adverse effect on the Work as scheduled.

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

SC-5.01 Add the following new paragraphs immediately after Paragraph 5.01.C:

D. Right-of-Ways: Where Work is in the highway or railroad right-of-way, access may be restricted, and space may be limited. The Contractor is subject to the provisions, as required by the State's Department of Transportation (DOT), County permit, or railroad right-of-way officer or permission document. The Owner will have the right to cease production, at no cost to the Owner, if the Contractor violates the DOT, County permit, or railroad provisions until such time that the Contractor is in compliance with required permit or access provisions.

E. The Contractor shall be responsible for all damage to crops and other property outside of the boundaries of the rights-of-way and easements and shall make satisfactory settlement for such damage directly with the property owner and tenant involved, as their interests in such damage may require.

F. Prior to commencing any work on the BNSF railroad right of ways, Contractor is to complete the safety training program at Internet Website http://www.bnsfcontractor.com. This training must be completed no more than one year in advance of Licensee's entry on the Premises.

G. The Contractor shall be responsible for completing, submitting, coordinating, and paying for the Burlington Northern Santa Fe (BNSF) railroad "Request for Inspector Coordinator and Flagging Field Services" required for all Work within the BNSF railroad right-of-way. Per BNSF requirements, no Work shall commence on the BNSF right-of-way without the presence of a Wilson & Company Inspector Coordinator.

Contact Information: WilsonCompany.Utility.IC@Wilsonco.com
Contact Information Phone: (816) 556-3624

H. The Contractor shall be responsible for completing, submitting, coordinating, and paying for the Canadian Pacific (CP) railroad flagging field services required for all Work within the CP railroad right-of-way. Per CP requirements, no Work shall commence on the CP right-of-way until CP Call-Before-You-Dig has been called no less than 5 working days prior to date on that Work is to be performed. This number will also get you in touch with the right Roadmaster and to arrange flagging.

Contact Information Phone: (866) 291-0741

I. The Contractor shall be responsible for completing, submitting, coordinating, and paying for the Red River Valley and Western (RRVW) railroad flagging field services required for all Work within the RRVW railroad right-of-way. Per RRVW requirements, no Work shall commence on the RRVW right-of-way until approval has been granted. This number will also get you in touch with the right Roadmaster and to arrange flagging.

Contact Information Phone: (701) 642-8257

5.02 *Use of Site and Other Areas*

SC-5.02 Delete paragraph 5.02.A.2 in its entirety and insert the following in its place:

1. If a damage or injury claim is made by the Owner or occupant of any such land or area because of the performance of the Work, or because of other actions, omissions, or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, 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) defend, indemnify, and hold harmless Owner, Engineer, the State of North Dakota, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any and all claims, losses, liabilities, damages, expenses, demands, suits, fines, judgments, costs, expenses, and fees (including all fees and charges of attorneys, engineers, architects, and other professionals and all court, arbitration, mediation, or other resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner, tenant, occupant, or other party against Owner, Engineer, the State of North Dakota, or any other party indemnified under the Contract Documents 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, omissions, or conduct of the Contractor or those for which Contractor is responsible, including all damages arising out of or relating to the indemnified parties' own negligence, but excepting any damages arising out of or relating to the indemnified parties' own willful misconduct or fraud or those parties' willful or negligent violation of law. Contractor's obligations include all costs, expenses, and fees incurred by Owner, Engineer, or the State of North Dakota in establishing and litigating the existence, scope, or any other matters relating to Contractor's obligations to defend, indemnify, and hold harmless. Contractor's obligations to defend will be free of any conflicts of interest, even if retention of separate legal counsel is necessary. Contractor's duties to defend, indemnify, and hold harmless include anything in excess of any minimum insurance requirements described under the Contract Documents, and anything in excess of any of Contractor's insurance policy limits. Contractor's obligations to defend, indemnify, and hold harmless will continue following completion of the Work, and following any termination or expiration of this Contract.

SC-5.02 Add the following new paragraphs immediately after Paragraph 5.02.D:

E. Control of Work:

1. The Contractor shall execute the Work so that it will cause the least practicable interference with, and avoid prolonged interruption of or damage to, existing facilities, underground utilities, overhead utilities, and roadways. The Contractor shall obtain

written approval from the Owner at least seven (7) days before performing any Work that involves either connection to existing facilities or interruption of service or existing operations. The Contractor shall perform that Work when it causes the least interference or annoyance, as determined by the Owner and Engineer.

2. The Contractor shall initiate, maintain, and supervise all weather protection and local and area climatic and seasonal precipitation event programs applicable to the Work. In the event of severe weather, the Contractor shall immediately inspect the Work at the Site and take all necessary actions to ensure that public access and safety are maintained.

3. The Contractor shall be responsible for: (a) performing the pumping, draining, and controlling of surface water and groundwater in a way that it will not endanger the Work or any adjacent facility or property, or interrupt, restrict, or interfere with the use of any adjacent facility or property, and (b) taking into account any dewatering operations from other Work.

4. Neither the Owner nor Engineer will accept or coordinate deliveries for the Contractor. The Contractor shall coordinate and be at the site to receive all deliveries. Materials and equipment stored on the site or right of way shall be placed so as to insure minimum danger and obstruction to the traveling public or property owners.

5. The Contractor shall take whatever steps, procedures, or means required to prevent dust nuisance due to the Contractor's operations on-site, along haul routes, within stockpile areas, and within or along equipment or material staging areas. Dust control measures shall be maintained at all times to the satisfaction of the Owner and Engineer and as required by any other Political Subdivision with jurisdiction.

6. Any dumping of spoil or waste material by the Contractor shall comply with all Federal, State, and local laws and regulations. Whether public or private landfills are used, the Contractor shall pay all required dumping fees and shall furnish to the Engineer evidence of such payments."

5.03 *Subsurface and Physical Conditions*

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

E. In the preparation of Drawings and Specifications, Engineer relied upon the following information of explorations and tests of subsurface conditions at the Site, if any. It shall be the responsibility of the Contractor to determine to Contractor's own satisfaction the location and nature of surface and subsurface obstacles and the soil and water conditions, which will be encountered during the Work. Additional test borings and other exploratory options may be made by the Contractor at Contractor's own expense. Contractor shall make arrangements for soil investigation with Owner. Reports and existing drawings are intended for reference only. Contractor shall verify existing conditions prior to Bidding.

1. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data (if any), and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Date of Report	Technical Data
None	-	-

2. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface and subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data (if any), and specifically identifies the Technical Data upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
None	-	-

F. Copies of reports and drawings itemized in SC 5.03.E, if any, that are not included with the Bidding Documents may be examined at Advanced Engineering and Environmental Services, LLC. (AE2S) in the Engineer of Record's home office location during regular business hours. These reports and drawings, if any, are not part of the Contract Documents, but the "technical data" contained therein upon which Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer and Engineer's Consultants in the preparation of Drawings and Specifications.

5.05 *Underground Facilities*

SC-5.05 Add the following new paragraphs immediately after Paragraph 5.05.A.5:

6. contacting all affected utilities prior to construction on this Contract and making his own investigations including exploratory excavation as needed to determine the location and type of crossing or paralleling a particular utility; associated costs shall be subsidiary to the pipeline unit prices, and shall be made in accordance with that specific State's Department of Health, State's Department of Environment and Natural Resource, or similar department;

7. notification to all utilities and underground service agencies a minimum of 72 hours in advance of Work scheduled or envisioned and arrange to have their respective services located. The Contractor shall obtain acceptance, in writing, from the utility regarding the preservation of their respective service during construction. The acceptance letters/forms shall be submitted monthly (at a minimum) to the Owner's representative;

8. using extreme care when working around overhead utilities. If required, work permits from the respective utility shall be obtained by the Contractor. Should any facility, either underground or overhead, be unexpectedly encountered or damaged during construction, the Contractor shall immediately notify a representative of the company involved and take such steps as necessary for protection of the general public and his own personnel.

SC-5.05 Add the following new paragraph immediately after Paragraph 5.05.F:

G. The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work and for the purpose of maintaining and making repairs to their property.

5.06 *Hazardous Environmental Conditions at Site*

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Date of Report	Technical Data
None	-	-

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
None	-	-

SC-5.06 Delete Paragraph 5.06.I in its entirety.

SC-5.06 Delete Paragraph 5.06.J in its entirety and insert the following in its place:

J. Contractor will defend, indemnify, and hold harmless Owner, Engineer, the State of North Dakota, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against any and all claims, losses, liabilities, damages, expenses, demands, suits, fines, judgments, costs, expenses, and fees (including all fees and charges of attorneys, engineers, architects, and other professionals and all court, arbitration, mediation, or other 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, including all damages arising out of or relating to the indemnified parties' own negligence, but excepting any damages arising out of or relating to the indemnified parties' own willful misconduct or fraud or those parties' willful or negligent violation of law. Contractor's obligations include all costs, expenses, and fees incurred by Owner, Engineer, or the State of North Dakota in establishing and litigating the existence, scope, or any other matters relating to Contractor's obligations to defend, indemnify, and hold harmless. Contractor's obligations to defend will be free of any conflicts of interest, even if retention of separate legal counsel is necessary. Contractor's duties to defend, indemnify, and hold harmless include anything in excess of any minimum insurance requirements described under the Contract Documents, and anything in excess of any of Contractor's insurance policy limits. Contractor's obligations to defend, indemnify, and hold harmless will continue following completion of the Work, and following any termination or expiration of this Contract.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01 Delete Paragraph 6.01.A in its entirety and insert the following new paragraph in its place:

A. Contractor shall furnish performance and payment bonds, 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 Documents. These bonds shall remain in effect at 100 percent of the Contract Price for one (1) full year after the date when Substantial Completion is granted or to the end of the Warranty Period, whichever is greater, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

SC-6.01 Add the following paragraph immediately after Paragraph 6.01.B:

1. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be one (1) year after Final Completion.

6.03 *Contractor's Insurance*

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds the following: Advanced Engineering and Environmental Services, LLC (AE2S); the State of North Dakota; and Greater Ramsey Water District (GRWD).

E. *Other Additional Insureds:* All agencies of the State of North Dakota, including the Department of Water Resources, and all Officers and Employees of each additional insured party, shall also have all the benefits, rights and coverage of an additional insured under these policies. Policies shall contain a "Waiver of subrogation in favor of the State of North Dakota" waiving any right of recovery the insurance company may have against the State.

F. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	**Policy limits of not less than:**
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Employer's Liability	
Each accident	$1,000,000
Each employee	$1,000,000

G. *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 claims for:

1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,

2. damages insured by reasonably available personal injury liability coverage, and

3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

H. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.

   a. Such insurance must 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, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Severability of interests and no insured-versus-insured or cross-liability exclusions.

4. Underground, explosion, and collapse coverage.

5. Personal injury coverage.

6. 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). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

7. 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.

I. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).

2. Any exclusion for water intrusion or water damage.

3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.

4. Any exclusion of coverage relating to earth subsidence or movement.

5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).

6. Any limitation or exclusion based on the nature of Contractor's work.

7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

J. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	$2,000,000
Products—Completed Operations Aggregate	$2,000,000
Personal and Advertising Injury	$2,000,000
Bodily Injury and Property Damage—Each Occurrence	$2,000,000

K. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance 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 must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	$1,000,000
Each Accident	$2,000,000
Property Damage	
Each Accident	$1,000,000
[or]	
Combined Single Limit	
Combined Single Limit (Bodily Injury and Property Damage)	$2,000,000

L. *Contractor's Pollution Liability:* Contractor shall purchase insurance, including naming railroad entities and railroad associated or affiliated subsidiaries (and the Directors, Officers, employees, agents and trustees of all the foregoing) as an additional insured. Coverage shall include, but not be limited to, claims for bodily injury, death, damage to property including the loss of use thereof, clean-up costs and associated legal defense expenses arising from pollution conditions caused by, and/or exacerbated by, services performed by the Licensee on behalf of RR entity. The policy shall be endorsed to contain a blanket contractual liability endorsement. If this policy is written on a "claims-made" basis it shall remain in effect for no less than twenty-four (24) months after the expiry or termination of this Agreement.

Contractor's Pollution Liability	Policy limits of not less than:
Each Occurrence	$2,000,000
General Aggregate	$2,000,000

M. *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. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	$2,000,000
General Aggregate	$2,000,000

N. *Contractor's Professional Liability Insurance:* 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 must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

Contractor's Professional Liability	Policy limits of not less than:
Each Claim	$2,000,000
Annual Aggregate	$2,000,000

O. *Railroad Protective Liability Insurance:* Prior to commencing any Work within 50 feet of railroad-owned and controlled property, Contractor shall (1) endorse its commercial general liability policy with ISO CG 24 17, removing the contractual liability exclusion for work within 50 feet of a railroad, (2) purchase and maintain railroad protective liability insurance meeting the following requirements, (3) furnish a copy of the endorsement to Owner, and (4) submit a copy of the railroad protective policy and other railroad-required documentation to the railroad, and notify Owner of such submittal. Insurance requirements may vary between railroad companies. The Contractor shall be required to obtain the proper insurance certificates as requested by all railroad entities.

Railroad Comprehensive Liability Insurance	Policy limits of not less than:
Combined Single Limit Per Occurrence	$2,000,000
Aggregate	$5,000,000

Railroad Automobile Liability Insurance	Policy limits of not less than:
Combined Single Limit Per Occurrence	$2,000,000

Railroad Worker's Compensation Insurance	Policy limits of not less than:
State	Statutory
Federal	Statutory
Employer's Liability	
Each accident	$1,000,000
Each employee	$1,000,000

Contractor's Pollution Liability	Policy limits of not less than:
Each Occurrence	$2,000,000
General Aggregate	$2,000,000

Railroad Protective Liability Insurance	Policy limits of not less than:
Each Claim	$5,000,000
Aggregate	$10,000,000

P. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly *referred* to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.

Unmanned Aerial Vehicle Liability Insurance	Policy limits of not less than:
Each Claim	$2,000,000
General Aggregate	$2,000,000

Q. The insurance required by the Contract Documents, through a policy or endorsement, will include and meet the following additional requirements:

1) Any deductible or self-insured retention amount or other similar obligation under the policies will be Contractor's sole responsibility.

2) The policies must be from insurers rated "A" or better by A.M. Best Company, Inc.

3) All policies will name Contractor as the insured and Owner, Engineer, and the State of North Dakota as additional insured parties.

4) Contractor's policies will be primary and noncontributory regarding any other insurance available to Owner, Engineer, and the State of North Dakota as additional insured parties.

5) Contractor's policies must each contain a "waiver of subrogation" that waives any right to recovery any of Contractor's insurance companies might have against Owner, Engineer, and the State of North Dakota.

6) Contractor's policies must each contain a provision that the policies and any endorsements may not be cancelled or modified without 30 days prior written notice to Owner, Engineer, and the State of North Dakota.

7) Contractor's policies must each contain a provision that Contractor's insolvency or bankruptcy will not release the insurer from payment under the policy, even when Contractor's insolvency or bankruptcy prevents Contractor from meeting the retention limit under the policy.

8) Contractor's policies must each contain cross liability/severability of interests, to ensure that all additional insured parties are covered as if they were all separately covered.

9) Contractor's policies must each contain a provision that the legal defense provided to Owner, Engineer, and the State of North Dakota must be free of any conflicts of interest, even if retention of separate legal counsel is necessary.

10) Contractor's policies must each contain a provision that any attorney who represents the State of North Dakota must first qualify as and be appointed by the North Dakota Attorney General as a Special Assistant Attorney General as required under N.D.C.C. § 54-12-08.

11) Contractor's policies will not limit in any way Contractor's duties to release, defend, hold harmless, and indemnify Owner, Engineer, the State of North Dakota, and those parties' officers, employees, agents, consultants, subcontractors, and representatives.

12) Before commencing the construction services under this Agreement, Contractor will deliver to Owner copies of the insurance policies and endorsements required under this Agreement, and will otherwise provide all requisite evidence that the insurance required under this Agreement is in full force and effect. Contractor's duties to release, defend, indemnify, protect and hold harmless Owner, Engineer, the State of North Dakota and those parties' officers, agents, representatives, employees, or contractors include anything in excess of the minimum insurance requirements described above. Owner's receipt of any certificates, policies, or endorsements required under this Agreement will not in any way limit or impact Contractor's duties and obligations to maintain the insurance required under this Contract. Contractor will ensure that any and all of Contractor's subcontractors, suppliers, and other parties or entities performing or furnishing any of the Work purchase and maintain the same insurance with the same conditions and terms required of Contractor under the Contract Documents.

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Delete Paragraph 6.04.B and insert the following in its place:

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof.

1. This insurance shall:

a. Include the interests of Owner, Contractor, Subcontractors, Engineer, and any other individuals or entities identified herein, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

b. Be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, false work, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, 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;

c. Include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

d. Cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

e. Allow for partial utilization of the Work by Owner;

f. Include testing and startup; and

g. Be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

2. Contractor shall be responsible for any deductible or self-insured retention.

3. The policies or insurance required to be purchased and maintained by Contractor in accordance with this Paragraph SC-6.04.B shall comply with the requirements of Paragraph 6.03 of the General Conditions and as revised by the Supplementary Conditions.

4. Additional Insureds:

a. Greater Ramsey Water District (GRWD).

b. Advanced Engineering and Environmental Services, LLC (AE2S).

c. State of North Dakota.

SC-6.04 Delete Paragraphs 6.04C and 6.04.D in their entirety.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.03 *Labor; Working Hours*

SC-7.03 Delete Paragraph 7.03.B in its entirety, and insert the following:

B. Contractor shall be fully responsible to Owner, Engineer, and the State of North Dakota for all acts and omissions of Contractor's employees, agents, and representatives, and all Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work, as well as all of those parties' employees, agents, and representatives, just as Contractor is responsible for Contractor's own acts and omissions. Contractor will ensure any and all Subcontractors and Suppliers purchase and maintain the same insurance with the same conditions and terms required of Contractor under the Contract Documents.

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be **7:00 AM to 7:00 PM** local time.
2. Owner's legal holidays are all federal holidays.
3. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent given after Contractor has provided written notice to Engineer a minimum of five (5) days in advance.

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:

D. The Contractor shall be responsible for the conduct of Contractor's employees and employees of Subcontractors and suppliers on the Work Site. The Contractor shall take immediate steps to remedy any activity that may be construed as discriminatory, or which creates a hostile work environment. Activities covered by this provision include, but shall not be limited to, physical contact or signs or language that is vulgar, profane, or racially or sexually derogatory.

7.05 *"Or Equals"*

SC-7.05 Add the following new subparagraph immediately after Paragraph 7.05.C:

1. "Or Equals" items of materials or equipment will be considered only during the bidding period as outlined in the Instructions to Bidders and Paragraph 7.05 of the General Conditions.

7.06 *Substitutes*

SC-7.06 Add the following new subparagraph immediately after Paragraph 7.06.C:

1. Substitute items of materials or equipment will be considered only during the bidding period as outlined in the Instructions to Bidders and Paragraph 7.06 of the General Conditions.

7.07 *Concerning Subcontractors and Suppliers*

SC-7.07 Amend Paragraph 7.07.D to include the following language after the last sentence:

If Owner or Engineer after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in the cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

SC-7.07 Add the following new paragraph immediately after Paragraph 7.07.M:

N. All Subcontractors must possess a North Dakota Contractor License prior to beginning Work.

SC-7.08 Delete Paragraph 7.08.B in its entirety.

SC-7.08 Delete Paragraph 7.08.C in its entirety and insert the following:

C. Contractor will defend, indemnify, and hold harmless Owner, Engineer, the State of North Dakota, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any and all claims, losses, liabilities,

damages, expenses, demands, suits, fines, judgments, costs, expenses, and fees (including all fees and charges of attorneys, engineers, architects, and other professionals and all court, arbitration, mediation, or other resolution costs) arising out of or relating to 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, including all damages arising out of or relating to the indemnified parties' own negligence, but excepting any damages arising out of or relating to the indemnified parties' own willful misconduct or fraud or those parties' willful or negligent violation of law. Contractor's obligations include all costs, expenses, and fees incurred by Owner, Engineer, or the State of North Dakota in establishing and litigating the existence, scope, or any other matters relating to Contractor's obligations to defend, indemnify, and hold harmless. Contractor's obligations to defend will be free of any conflicts of interest, even if retention of separate legal counsel is necessary. Contractor's duties to defend, indemnify, and hold harmless include anything in excess of any minimum insurance requirements described under the Contract Documents, and anything in excess of any of Contractor's insurance policy limits. Contractor's obligations to defend, indemnify, and hold harmless will continue following completion of the Work, and following any termination or expiration of this Contract.

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

B. Contractor shall provide Owner with a certificate from the North Dakota State Tax Commissioner's Office stating that Contractor does not have any delinquent income, sales, or use taxes outstanding.

7.11 *Laws and Regulations*

SC-7.11 Delete the first sentence of Paragraph 7.11.B and insert the following sentence in its place:

B. If Contractor performs any Work or takes any 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 will defend, indemnify, and hold harmless Owner, Engineer, the State of North Dakota, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against any and all claims, losses, liabilities, damages, expenses, demands, suits, fines, judgments, costs, expenses, and fees (including all fees and charges of attorneys, engineers, architects, and other professionals and all court, arbitration, mediation, or other resolution costs) arising out of or relating to such Work or other action, including all damages arising out of or relating to the indemnified parties' own negligence, but excepting any damages arising out of or relating to the indemnified parties' own willful misconduct or fraud or those parties' willful or negligent violation of law. Contractor's obligations include all costs, expenses, and fees incurred by Owner, Engineer, or the State of North Dakota in establishing and litigating the existence, scope, or any other matters relating to Contractor's obligations to defend, indemnify, and hold harmless. Contractor's obligations to defend will be free of any conflicts of interest, even if retention of separate legal counsel is necessary. Contractor's duties to defend, indemnify, and hold harmless include anything in excess of any minimum insurance requirements described under the Contract Documents, and anything in excess of any of Contractor's insurance policy limits. Contractor's obligations to defend, indemnify, and hold harmless will continue following completion of the Work, and following any termination or expiration of this Contract.

7.12 *Record Documents*

SC-7.12 Amend Paragraph 7.12.A to include the following language after the last sentence:

If the requirements of this Paragraph 7.12.A have not been satisfied, Engineer may negate all or part of a progress payment until compliance is reached.

7.13 *Safety and Protection*

SC-7.13 Add a new paragraph immediately after Paragraph 7.13.J:

K. Contractor agrees to promptly notify Owner of all potential Claims which arise from or result from this agreement. Contractor further agrees to take all reasonable steps to preserve all physical evidence and information which may be relevant to the circumstances surrounding a potential claim, while maintaining public safety, and to grant to the Owner the opportunity to review and inspect such evidence, including the scene of the accident.

7.18 *Indemnification*

SC-7.18 Delete Paragraph 7.18.A in its entirety and insert the following:

A. Contractor will defend, indemnify, and hold harmless Owner, Engineer, and the State of North Dakota, and those parties' officers, employees, agents, consultants, subcontractors, and representatives, from and against any and all claims, losses, liabilities, damages, expenses, demands, suits, fines, judgments, costs, expenses, and fees (including all fees and charges of attorneys, engineers, architects, and other professionals and all court, arbitration, mediation, or other resolution costs) arising out of or relating to the Work, the Project, or any act or omission of Contractor, or those for which Contractor is responsible, including all damages arising out of or relating to the indemnified parties' own negligence, but excepting any damages arising out of or relating to the indemnified parties' own willful misconduct or fraud or those parties' willful or negligent violation of law. Contractor's obligations include all costs, expenses, and fees incurred by Owner, Engineer, or the State of North Dakota in establishing and litigating the existence, scope, or any other matters relating to Contractor's obligations to defend, indemnify, and hold harmless. Contractor's obligations to defend will be free of any conflicts of interest, even if retention of separate legal counsel is necessary. Contractor's duties to defend, indemnify, and hold harmless include anything in excess of any minimum insurance requirements described under the Contract Documents, and anything in excess of any of Contractor's insurance policy limits. Contractor's obligations to defend, indemnify, and hold harmless will continue following completion of the Work, and following any termination or expiration of this Contract.

SC-7.18 Delete Paragraph 7.18.B in its entirety and insert the following:

B. In any and all claims against Owner, Engineer, and the State of North Dakota, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any 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.

ARTICLE 8—OTHER WORK AT THE SITE

8.02 *Coordination*

SC-8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:

C. Owner intends to contract with other contractors listed below for the performance of other work at or adjacent to the Site.

1. None specified at the writing of these Supplementary Conditions. If Owner contracts work at or adjacent to the Site, Contractor shall work with Owner to coordinate with other various contractors and work forces at the Site.

8.03 *Legal Relationships*

SC-8.03 Delete Paragraph 8.03.C in its entirety and insert the following:

C. If Contractor damages, delays, disrupts, or 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, Engineer, or the State of North Dakota, 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) defend, indemnify, and hold harmless Owner, Engineer, the State of North Dakota, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any and all claims, losses, liabilities, damages, expenses, demands, suits, fines, judgments, costs, expenses, and fees (including all fees and charges of attorneys, engineers, architects, and other professionals and all court, arbitration, mediation, or other resolution costs) arising out of or relating to any damage, delay, disruption, or interference, including all damages arising out of or relating to the indemnified parties' own negligence, but excepting any damages arising out of or relating to the indemnified parties' own willful misconduct or fraud or those parties' willful or negligent violation of law. Contractor's obligations include all costs, expenses, and fees incurred by Owner, Engineer, or the State of North Dakota in establishing and litigating the existence, scope, or any other matters relating to Contractor's obligations to defend, indemnify, and hold harmless. Contractor's obligations to defend will be free of any conflicts of interest, even if retention of separate legal counsel is necessary. Contractor's duties to defend, indemnify, and hold harmless include anything in excess of any minimum insurance requirements described under the Contract Documents, and anything in excess of any of Contractor's insurance policy limits. Contractor's obligations to defend, indemnify, and hold harmless will continue following completion of the Work, and following any termination or expiration of this Contract.

ARTICLE 9—OWNER'S RESPONSIBILITIES

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12:

9.13 *Owner's Site Representative*

A. Owner may furnish an "Owner's Site Representative" to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative is not Engineer's consultant, agent, or employee. Owner's Site Representative will be identified by the Owner at the preconstruction meeting, if any. The authority and responsibilities of Owner's Site Representative will be identified at the preconstruction meeting, if any.

B. The Owner may, from time to time, provide representatives during construction to also observe the Work and report to the Owner.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.02 *Visits to Site*

SC-10.02 Add the following new paragraphs immediately after Paragraph 10.02.B:

C. Progress Meetings

1. The Engineer shall schedule and hold regular on-Site progress meetings at least monthly and at other times (i.e. – more or less frequently) as requested by Contractor or as required by progress of the Work. The Contractor, Engineer, and all Subcontractors active on the Site shall attend each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.

2. The Engineer will preside at the progress meeting and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the contractors shall present any issues which may impact progress with a view to resolve these issues expeditiously.

10.03 *Resident Project Representative*

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

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. The Owner will designate the Engineer to represent the Owner's interest during the course of construction. The authority of the Engineer and RPR's is further defined in Article 10 of the General Conditions. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

b. Observe whether any Work in place appears to be defective.

c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

a. Participate in Engineer's visits regarding Substantial Completion.

b. Assist in the preparation of a punch list of items to be completed or corrected.

c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

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

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

D. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract Documents 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 or contract, tort or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, or to any surety for or employee or agent of any of them.

ARTICLE 11—CHANGES TO THE CONTRACT

11.05 *Owner-Authorized Changes in the Work*

SC-11.05 Add new paragraphs immediately after Paragraph 11.05.C:

D. Except as specifically authorized in writing by the Engineer at the time additional Work is done beyond the original scope of the Contract Documents, the Contractor shall make no claims for additional compensation. The Contractor's plea of ignorance of foreseeable conditions which will create difficulties or hindrances in the execution of the Work will not be acceptable to the Owner as an excuse for any failure of the Contractor to fulfill the requirements of the Contract Documents, and shall not be a basis for the Contractor's claim for additional compensation. Any discrepancies in, or conflicts between, the items described in these Contract Documents must be submitted in writing to the Engineer for adjustment prior to proceeding with the Work, as any claims for additional compensation to achieve compliance with the requirements of those items will not be allowed or considered.

ARTICLE 12—CLAIMS

12.01 *Claims*

SC-12.01 Add new paragraphs immediately after Paragraph 12.01.G:

H. *Claims between Contractors*

1. Should Contractor cause damage to the Work or property of any separate contractor at the Site, or should any claim arising out of Contractor's performance of Work at the Site be made by any separate Contractor against another Contractor, the Owner, Engineer, or Engineer's Consultants, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration, or at law.

2. Contractor shall, to the fullest extent permitted by Law, indemnify and hold harmless Owner, Engineer, Engineer's Consultant and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any separate contractor against Owner, Engineer, or Engineer's Consultant to the extent that said claim is based on, or arises out of, Contractor's performance of the Work. Should a separate contractor cause damage to the Work or

property of Contractor, or, should the performance of the Work by any separate contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or Engineer's Consultant or permit any action against any of them to be maintained and continued in its name or for its benefit in any court, or before any arbiter, which seeks to impose liability on, or to recover damages from, Owner, Engineer, or Engineer's Consultant on account of any such damage or Claim.

3. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and Engineer's Consultant(s) for any delay, disruption, interference or hindrance caused by any separate contractor.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.01 *Cost of the Work*

SC-13.01 Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of Rental Rate Blue Book for Construction Equipment or the AED Green Book: Rental Rates & Specifications for Construction Equipment or as identified during a preconstruction conference and agreed to by Owner, Engineer, and Contractor.

SC-13.01 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

a. For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than $500.

13.03 *Unit Price Work*

SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. *Adjustments in Unit Price*

1. There will be no adjustments in the Unit Prices for Unit Price Work for increased or decreased quantities under this Contract. Quantities for items listed on the Contractor's Bid Form will be measured during construction by Engineer's Field Representative, and the final measured quantities multiplied by the Unit Price shall be used to determine the Contract Price. To complete the Project in accordance with the intent of the Contract Documents it is anticipated that quantities of several items will be more or less than estimated on the Contractor's Bid Form. Accordingly, there will be no compensation for material restocking, if necessary.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCCEPTANCE OF DEFECTIVE WORK

14.02 *Tests, Inspections, and Approvals*

SC-14.02 Delete Paragraph 14.02.B in its entirety and insert the following in its place:

B. Contractor 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, unless specifically identified as a service to be retained and paid for by the Owner.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 *Progress Payments*

SC-15.01 Add the following new Paragraphs immediately following Paragraph 15.01.C.6.e:

f. Failure to make payment to Subcontractors, Supplier, or labor.

g. Claims made by Engineer for additional compensation because of Contractor delays or rejection of *defective* Work.

h. Liability for liquidated damages has been incurred by Contractor.

SC-15.01 Delete Paragraph 15.01.D and replace with the following:

D. *Payment Becomes Due*

1. Forty-five (45) days after presentation of the Application for Payment to the Owner's Board of Directors with Engineer's recommendation, and if approved by the Owner's Board of Directors, the amount recommended will (subject to the provisions of Paragraph 15.01.C and 15.01.E) become due, and when due will be paid by Owner to Contractor.

15.03 *Substantial Completion*

SC-15.03 Add the following new subparagraph to Paragraph 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, will 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 this Article 15.

15.04 *Partial Use or Occupancy*

SC-15.04 Add the following new subparagraph to Paragraph 15.04.A:

5. Owner may at any time request in writing Contractor to permit Owner to take over operation of any part of the Work although it may not be substantially complete. A copy of such request will be sent to Engineer, and within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed

or corrected prior to final payment. If Contractor does not object in writing to Owner and Engineer that such part of Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such list to Owner and Contractor together with a written recommendation as to the division of responsibility pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties, and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time the Owner takes over such operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.

15.05 *Final Inspection*

SC-15.05 Add the following new Paragraph 15.05.B:

B. Upon correction of deficiencies and completion of the entire Work within each Project Zone, Contractor shall notify Engineer in writing requesting a final inspection. If, in the Opinion of the Engineer, the Contractor has satisfactorily completed the Work within each respective Project Zone, Contractor, Engineer, and Owner shall execute the Final Inspection and Acceptance form.

15.08 *Correction Period*

SC-15.08 Add the following new Paragraphs 15.08.G and 15.08.H:

G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be two (2) years after Substantial Completion.

H. It is understood that during the warranty period, repairs due to faulty workmanship or materials shall be covered by the Performance Bond. However, a break in one of the pipelines shall be deemed an emergency and must be repaired immediately. The Contractor, therefore, prior to leaving the Project, shall have an understanding and agreement by signed letter or appropriate entry in the Owner's minutes of the meeting as to procedure for making said emergency repairs and notifications to the Contractor.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 Owner May Suspend Work

SC-16.01 Add the following new paragraph immediately after Paragraph 16.01.A.

B. Historical/Archaeological Finds: If during the course of construction evidence of deposits of historical or archaeological interest is found, the Contractor shall cease operations affecting the find and shall notify the Owner, and the State Historical Society or similar agency of reporting within that particular state. No further disturbance of the deposits shall ensue until the Contractor has been notified in writing by the Engineer that he may proceed.

16.03 Owner May Terminate for Convenience

SC-16.03 Delete Paragraph 16.03.A.3. in its entirety and insert the following:

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal, but not including claims, costs, losses, or damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

17.01 *Methods and Procedures*

SC-17.01 Delete Paragraphs 17.01.A and B in their entirety and replace with the following.

A. For any conflicts that arise during the design, construction, or following completion of the Project, the Contractor and Engineer agree that all disputes between them arising out of or relating to this agreement shall be resolved, if possible, at the staff level of those involved in the Project. If any conflict or dispute cannot be resolved between the Contractor and Engineer staff involved in the Project, the presidents and project managers of the respective entities will meet to attempt to resolve any dispute. If resolution is not achieved, the dispute shall be submitted to non-binding mediation.

B. The rights and remedies available to the Contractor shall be limited to breach of Contract, and no other cause or action, including, without limitation, negligence, misrepresentation, or other theory. The Owner or Contractor may assert any such breach of Contract claim in any court of competent jurisdiction. Neither the Owner nor the Contractor shall be entitled to a jury trial for any such action. The right and remedies to the Owner hereunder shall be in addition to and shall not be construed in any way as a limitation of any rights and remedies available to the Owner which are otherwise available by law or contract, by special warranty or guarantee, or by other provisions of the Contract Documents. The provision of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which it may apply. All representations, warranties and guarantees made in the Contract Documents shall survive final payment, termination, or completion of this agreement.

C. No waiver or failure to enforce any part or provision of the Contract Documents, including, but not limited to the change order process, shall be considered a waiver by the Owner of any subsequent default or breach of the same or any other part of provision contained herein, or right to enforce the same or any part of provision contained herein.

ARTICLE 18—MISCELLANEOUS

No suggested Supplementary Conditions in this Article.

EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
a.1	General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.	Email	Email	
a.2	Meeting agendas, meeting minutes, RFI's and responses to RFI's, and Contract forms.	Email w/ Attachment	PDF	(2)
a.3	Contactors Submittals (Shop Drawings, "or equal" requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner's and Engineer's responses to Contractor's Submittals, Shop Drawings, correspondence, and Applications for Payment.	Email w/ Attachment or Newforma	PDF	
a.4	Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.	Email w/ Attachment or LFE or Newforma	PDF	
a.5	Layouts and drawings to be submitted to Owner for future use and modification.	Email w/ Attachment or LFE or Newforma	DWG	
a.6	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE or Newforma	DOC	
a.7	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	EXC	
a.8	Database files and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	DB	

Notes	
(1)	All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.
(2)	Transmittal of written notices is governed by Paragraph 18.01 of the General Conditions.

Key	
Email	Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies
LFE	Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive)
PDF	Portable Document Format readable by Adobe® Acrobat Reader
DWG	Autodesk® AutoCAD .dwg format
DOC	Microsoft® Word .docx format
EXC	Microsoft® Excel .xls or .xml format
DB	Microsoft® Access .mdb format

DIVISION 01
GENERAL REQUIREMENTS

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SECTION 01 10 00
SUMMARY OF WORK

GENERAL

1.01 SUMMARY

A. This section includes:

1. Project Description.
2. Project Work Covered by Contract Documents.
3. Contract Information.
4. Administrative and Procedural Sections.
5. Description of Work for All Construction.
6. Work by Owner.
7. Work Under Other Contracts.
8. Work Sequence.
9. Access to Streets and Highways.
10. Reference Standards.
11. NPDES Construction Storm Water Permit.
12. Fines.
13. Coordination of Existing Conditions and Contract Documents.
14. Salvaged Demolition Debris.
15. Restocking.

1.02 PROJECT DESCRIPTION

A. Greater Ramsey Water District (GRWD) currently operates a rural water system in east central North Dakota. The GRWD - 2024 User Expansion is intended to expand potable drinking water service to new customers throughout the district through the installation of new distribution and transmission pipelines, gate valves, and miscellaneous appurtenances ranging in size from 2-inch to 12-inch. The project, with all alternates, would add approximately 114 miles of distribution and transmission pipeline to the existing GRWD system.

B. Project Contracts include:

1. **Base Bid No. 1 – User Expansion (Base Users):** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 420,000 feet of 2-inch DR 11 IPS POLY pipeline, 4,000 feet of 3-inch DR 11 IPS POLY pipeline, 52,500 feet of 2-inch DR 11 IPS POLY directional bores, 400 feet of 3-inch DR 11 IPS POLY directional bores, one (1) steel cased railroad and highway bore, thirty-six (36) fittings ranging in size from 2-inch to 3-inch, ninety-four (94) tie-ins to the existing system, twenty-five (25) gate valves ranging in size from 2-inch to 3-inch, one-hundred twenty-four (124) residential curb stop valves, eighty-six (86) residential meter setter units, thirty-eight (38) frost-proof meter pits, one (1) 2-inch PRV manhole, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, gravel, and pavement repair.

2. **Base Bid No. 2 – Highway 19 Expansion (Poly):** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 200 feet of 2-inch DR 11 IPS POLY pipeline, 100 feet of 8-inch DR 13.5 IPS POLY pipeline, 15,000 feet of 12-inch DR 17 IPS POLY pipeline, 2,575 feet of 12-inch DR 17 IPS POLY directional bores, six (6) 12-inch fittings, four (4) tie-ins to existing system, four (4) gate valves ranging in size from 8-inch to 12-inch, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
3. **Base Bid No. 3 – Webster Connection:** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 100 feet of 2-inch DR 11 IPS POLY pipeline, 100 feet of 6-inch DR 17 IPS POLY pipeline, 200 feet of 6-inch DR 17 IPS POLY directional bores, two (2) tie-ins to existing system, two (2) gate valves ranging in size from 2-inch through 6-inch, one (1) 1-inch flush/air blow-off valve, one (1) 2-inch PRV and metering manhole, Electrical and I&C work to include cable and conduit between existing booster station and new vault, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
4. **Alternate No. 1 – Highway 19 Expansion (PVC):** Incremental cost difference to provide and install the following approximate quantities: 15,000 feet of 12-inch PVC SDR26 CL160 IPS pipeline in lieu of 15,000 feet of 12-inch DR 17 IPS POLY pipeline included as Work within Base Bid 2 – Highway 19 Expansion (Poly).
5. **Alternate No. 2 - Webster Transmission Expansion:** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 400 feet of 2-inch DR 11 IPS POLY pipeline, 21,500 feet of 4-inch DR 11 IPS POLY pipeline, 100 feet of 2-inch DR 11 IPS POLY directional bores, 650 feet of 4-inch DR 11 IPS POLY directional bores, one (1) 4-inch fitting, nine (9) tie-ins to existing system, eight (8) gate valves ranging in size from 2-inch to 4-inch, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
6. **Alternate No. 3A - South System Transmission Expansion (Poly):** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 42,500 feet of 8-inch DR 13.5 IPS POLY pipeline, 2,600 feet of 8-inch DR 13.5 IPS POLY directional bores, six (6) 8-inch fittings, two (2) tie-ins to existing system, five (5) 8-inch gate valves, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.
7. **Alternate No. 3B – South System Transmission Expansion (PVC):** Incremental cost difference to provide and install the following approximate quantities: 42,500 feet of 8-inch PVC SDR26 CL160 IPS pipeline in lieu of 42,500 feet of 8-inch DR 13.5 IPS POLY pipeline included as Work within Alternate No 3A – South System Transmission Expansion (Poly).

C. Project Funding

1. Funding for this Project is through, in part, the North Dakota Department of Water Resources (NDDWR) grants.

1.03 PROJECT WORK COVERED BY CONTRACT DOCUMENTS

A. Work associated with the Project will be comprised of the following Contracts:

1. Contract No. 1 – Pipeline Construction.

1.04 CONTRACT INFORMATION

A. The Owner will award a single Prime Contract for the Project as follows:

1. A single contract (Contract No. 1) for all work under the Base Bid 1, Base Bid 2, & Base Bid 3 unit price contract or;
2. A single contract (Contract No. 1) for all work under the Base Bid unit price contract and any combination of the alternates unit price contracts. Note that alternates with an ‘A’ or a ‘B’ option will award the ‘A’ option only or the ‘A’ and ‘B’ options if the corresponding alternate is accepted for award. Alternates with ‘B’ designation will not be awarded without award of the corresponding ‘A’ option.

B. The Contractor shall not commence work until proper execution of the contract and written authorization to proceed has been issued by the Owner. Proper execution of the contract shall include all surety bonds and insurance requirements.

C. The division of work as made by the specifications and contract drawings is for the purpose of specifying work which is required. There is no attempt to make classification according to trades or any agreements, which may exist between contractors or subcontractors and trade unions. Classification of the work shall be the Contractor's responsibility.

D. The location of work under these contract documents is located on property of the Owner or easements obtained by the Owner, as shown on the contract drawings.

E. Completion Dates:

1. Base Bid No. 1
   a. Zone A
      1) Substantial Completion - November 15, 2025
      2) Final Completion - June 15, 2026
   b. Zone B
      1) Substantial Completion - September 30, 2026
      2) Final Completion - November 15, 2026
2. Base Bid No. 2
   a. Substantial Completion – October 15, 2025
   b. Final Completion - June 15, 2026
3. Base Bid No. 3
   a. Substantial Completion – August 31, 2025
   b. Final Completion - September 30, 2025
4. Alternate No. 1
   a. Substantial Completion – October 15, 2025

b. Final Completion - June 15, 2026

5. Alternate No. 2
   a. Substantial Completion – September 30, 2026
   b. Final Completion - November 15, 2026
6. Alternate No. 3 (A and B)
   a. Substantial Completion - September 30, 2026
   b. Final Completion - November 15, 2026

F. Working Days

1. Working Days is defined as the continuous number of days allowed for each individual bid phase to be substantially completed where the start of the Working Days is the day stakes are placed by the Engineer at the request of the Contractor.
2. Substantial Completion is defined as the time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of the 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 of delivering potable water to Owner's customers. In addition, to achieve Substantial Completion of the Work for distribution and transmission pipelines and all associated appurtenances required for a complete and operable installation located in agricultural fields, completed Work shall include top soil replacement, spreading, and cultivation of disturbed field areas to allow full and unhindered use by property owners as agricultural land for seed bed purposes in the spring of the immediately following spring planting season in each respective Base Bid and Alternate. The terms "substantially complete" and "substantially completed" as applied to all or a part of the Work refer to Substantial Completion thereof.
3. Base Bid No. 1
   a. Zone A - 120 Working Days
   b. Zone B - 120 Working Days
4. Base Bid No. 2 - 30 Working Days
5. Base Bid No. 3 - 15 Working Days
6. Alternate No. 1 - 30 Working Days
7. Alternate No. 2 - 30 Working Days
8. Alternate No. 3A/B - 60 Working Days

G. Winter construction may be required. Contractor shall include in their Bid all necessary requirements for sequencing and winter construction to meet the completion dates.

H. Contractor shall replace, compact, and level top soil as part of Substantial Completion requirements. The pipeline installation's backfilling, compaction, and grading shall be completed within one mile of ongoing project pipeline installation. Prior to mobilizing to a new location backfilling, compaction, and grading shall be completed. Landscape final landscaping and seeding shall be part of Final Completion. Such work shall be completed within one (1) week of installation. Owner and Engineer reserve the right to halt pipeline installation work if restoration work is required further than one (1) mile from ongoing

pipeline installation. in this instance, work shall remain halted until restoration work is complete to owner and engineer satisfaction and is within one (1) mile of pipeline installation.

I. Liquidation Damages for this project are as indicated in the Standard Contract between Owner and Contractor.

J. Work of each Contract is identified in the following Articles. The lists may not necessarily be all inclusive and Contractor shall confirm that all necessary specification sections and drawings required to complete the work under each contract shall be included within each Contract.

1.05 CONTRACTUAL, ADMINISTRATIVE, AND PROCEDURAL SECTIONS APPLICABLE TO ALL CONTRACTS

A. Division 00 – Procurement and Contracting Requirements: All Sections.

B. Division 01 – General Requirements: All Sections.

1.06 DESCRIPTION OF WORK FOR CONTRACT NO. 1 – PIPELINE CONSTRUCTION INCLUDING BASE BID AND ALL ALTERNATES

A. Combined General and Electrical: The following is provided to assist the Bidder in locating the major components and Work associated with the various Contract bid items. It is not intended to provide an all-inclusive list of every drawing or specification that describes work associated with each Contract. In addition to the work shown or specified in the Specifications and Drawings listed below, Bidder shall include all work related to each Contract in the bidder's price for each bid.

1. GENERAL:
    a. Contractual, Administrative, and Procedural Sections.
        1) All Sections listed in Paragraph 1.05.
    b. Division 10 – Specialties
        1) All Sections.
    c. Division 31 – Earthwork
        1) All Sections.
    d. Division 32 – Exterior Improvements
        1) All Sections.
    e. Division 33 – Utilities
    f. All Sections.
    g. Division 40 – Process Interconnections.
        1) 40 00 00 – Process Integrations.
            (a) All Sections.
        2) 40 71 13 – Magnetic Flow Meters.
        3) 40 73 13 – Pressure and Differential Pressure Gauges.
    h. Drawings:
        1) All General Drawings.
        2) All Civil Drawings (Sheets with "T" and "D" designators).
2. ELECTRICAL:
    a. Contractual, Administrative, and Procedural Sections.
        1) All Sections listed in Paragraph 1.05.
    b. Division 26 – Electrical.

1) All Sections.

c. Division 40 – Process Interconnections.
   1) 40 70 00
      (a) 40 70 01 Instrumentation General Requirements.
      (b) 40 72 00 Level Measurement.
      (c) 40 73 00 Pressure Measurement.
      (d) 40 74 00 Temperature Measurement.

d. Drawings:
   1) All General Drawings.
   2) All Electrical Drawings.

1.07 WORK BY OWNER

A. Contractor shall coordinate the timing and operational requirements of the Work with the Owner and Engineer.

B. Decommissioning of process units, tanks, equipment or systems as required by the Contractor for the purposes of completing the Work. Decommissioning is limited to taking the unit, tank, item of equipment or system out of service. The Contractor is responsible for disconnecting piping, power, utilities, and controls; for demolition; for temporary valves, barriers, piping, barricades, and other temporary facilities; and all other Work.

C. Operation of existing facilities not taken out of service or otherwise made available to the Contractor for purposes of executing the Work.

1.08 WORK UNDER OTHER CONTRACTS

A. The Owner may award additional contracts, which may affect operation of the Contractor.

1.09 GENERAL COORDINATION

A. Coordinate Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed at a later date.

B. Verify characteristics of elements of interrelated materials are compatible; coordinate Work of various Sections having interdependent responsibilities for installing, connection to, and placing in service, such materials.

1.10 COORDINATION OF EXISTING CONDITIONS AND CONTRACT DOCUMENTS

A. Locate existing underground utilities in areas of work. Provide adequate means of support and protection during operations for utilities that are to remain in place.

B. The locations of the utilities shown on the Drawings cannot be guaranteed. Contractor shall determine exact location of utilities. Should uncharted or incorrectly charted piping or other utilities be encountered, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

C. Do not interrupt existing utilities except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

D. Take and verify dimensions of existing structures, piping, and equipment required for the proper fabrication and installation of new piping and equipment.

E. The Drawings indicate required pipe sizes and the general arrangement for major piping and equipment. Layout and arrangement for certain other piping systems shall be in conformance to the equipment items furnished. Locations shall be verified in the field by the Contractor. Valves and fittings furnished shall be of such dimensions to allow for the installation of this piping as shown on the Drawings.

F. The final length and location of required pipe connections shall be coordinated to meet the requirements and recommendations of the equipment manufacturer and shall be subject to the approval of the Owner and Engineer.

G. Install no work that directly connects to equipment until such time as complete shop drawings of said equipment have been reviewed and approved by the Engineer.

H. Discrepancies discovered before or after work has started shall be brought to the attention of the Engineer immediately, and the Engineer reserves the right to require minor changes in the work of Contractor to eliminate such discrepancies.

1.11 WORK SEQUENCE

A. Sequencing of the Work shall be the responsibility of the Contractor with input from all subcontractors. Refer to Section 01 12 16 - Work Sequence Requirements for additional information and Project requirements.

B. Coordinate construction schedule, Work Sequence, and operations with the occupancy requirements of other affected parties. Refer to Section 01 31 13 - Project Coordination and Section 01 31 19 - Project Meetings for Construction Coordination responsibilities and Construction Meeting responsibilities.

1.12 ACCESS TO STREETS AND HIGHWAYS

A. Maintain suitable means of access for property owners abutting streets and highways involved in construction, except as specifically permitted otherwise by Owner.

B. The Contractor shall be responsible for all construction signing, flagging, and protection of the public. Signing shall conform to requirements as set forth in the Manual on Uniform Traffic Control devices.

C. Whenever construction is stopped due to inclement weather, weekends, holidays, or other reasons, suitable access shall be provided for all property owners.

1.13 WORK ON STREET RIGHT-OF-WAY

A. All Work performed within the street or road right-of-way or utility easements shall be performed in accordance with the North Dakota Department of Transportation, North Dakota Standards for safety, protection of the public, signage, flagging, and surface restoration. Contractor shall be responsible for maintaining traffic at all times.

B. Contractor's traffic control including signage, flagging, barricades, and other means for protection of the public shall be in accordance with the approved traffic control plan, and the Manual of Uniform Traffic Control Devices, latest versions.

C. All other costs associated with special requirements for Work on street right-of-way or utility easements shall be incidental to contract price for that item of Work being performed.

1.14 WORK ON RAILROAD RIGHT-OF-WAY

A. All Work performed within the railroad right-of-way shall be performed according to the applicable railway requirements for safety, signage, flagging, and surface restoration.

B. Prior to commencing any work on the BNSF railroad right of ways, Contractor is to complete the safety training program at Internet Website http://www.bnsfcontractor.com. This training must be completed no more than one year in advance of Licensee's entry on the Premises.

C. **The Contractor shall be responsible for completing, submitting, coordinating, and paying for the BNSF railroad "Request for Inspector Coordinator and Flagging Field Services" required for all Work within the BNSF railroad right-of-way. Per BNSF requirements, no Work shall commence on the BNSF right-of-way without the presence of a Wilson & Company Inspector Coordinator. Contact Information: WilsonCompany.Utility.IC@Wilsonco.com Phone: (816)556-3624.**

1.15 TEMPORARY CONSTRUCTION

A. All temporary piping, pumps, and associated products for the Project shall be the responsibility of the General Contractor to construct, operate, and maintain. The General Contractor shall pay electricity costs associated with temporary pumping, tools, etc. as well as all other related costs for temporary construction required to complete the Work as included in Section 01 50 00 - Temporary Facilities and Controls.

1.16 STARTUP

A. Startup will require the Contractor to clean, disinfect, fill, pressurize, test, flush, pig, etc. new pipeline installations or modified pipe prior to placing online.

B. Contractor shall be fully responsible for all preparation leading up to startup including disposal of all flush and pigging water and cleaning solutions.

C. Contractor must properly dispose of chlorinated water or other disinfecting solution. Chlorinated water must be dechlorinated. Dechlorinated water will not be disposed of on the ground without approval. Sanitary Sewer is not available for disposal of water.

D. Refer to Section 01 12 16 - Work Sequence Requirements for additional information and Project requirements.

E. Contractor shall coordinate all startup activities to comply with all permits, licenses, contracts, and Owner requirements.

1.17 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of the standard, except when requirements that are more rigid are specified or are required by applicable codes.

B. The date of the standard is that in effect as of the bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.

C. Obtain copies of standards when required by contract documents. Maintain copy at job site during progress of the specific Work.

1.18 NPDES CONSTRUCTION STORM WATER PERMIT

A. The Project consists of disturbing more than one (1) acre of area and will require a NPDES/SDS Construction Storm Water Permit.

B. Contractor shall be responsible for all provisions required in the NPDES Construction Storm Water Permit for the Project including the storm water pollution prevention plan (SWPPP) that is required to be submitted with the permit and all comments received by the North Dakota Department of Health (NDDH) regarding the permit and SWPPP for approval.

C. See Section 01 50 00 - Temporary Facilities and Controls for additional requirements.

1.19 FINES

A. In the event the Owner is fined by the Environmental Protection Agency or North Dakota Department of Health as a result of the Contractor's actions or lack of actions, the Owner will deduct from payment, due to the Contractor, corresponding amounts to cover the cost of such fines, including the costs of related engineering and legal fees.

1.20 SALVAGED DEMOLITION DEBRIS

A. Owner shall have the right to retain select demolition materials or debris. At the discretion of Owner, select demolition materials or debris items shall be stored on-site and remain the property of the Owner. Owner shall designate the location for storage of salvageable demolition material or debris items. Contractor shall

place selected items in designated storage area.

1.21 RESTOCKING

A. There will be no additional compensation made to Contractor due to restocking charges for materials not used on the project.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 10 00

SECTION 01 12 16
WORK SEQUENCE REQUIREMENTS

GENERAL

1.01 SUMMARY

A. Section includes requirements for sequencing, scheduling, and completing the Work associated with distribution and transmission pipelines within the Base Bid and Alternatesincluding:

1. Observation, Operation, and Maintenance Access.
2. General Constraints on Sequence, Scheduling, and Completion of Work.
3. Interruption of Operations.
4. Shutdown Constraints.
5. Utilities.
6. Work by Others.

1.02 OBSERVATION, OPERATION, AND MAINTENANCE ACCESS

A. Provide safe, continuous access to Work site(s) and along pipeline installation areas for Owner and Engineer representatives at all times.

1.03 GENERAL CONSTRAINTS ON SEQUENCE, SCHEDULING, AND COMPLETION OF WORK

A. General Constraints:

1. Working Days
   a. Each bid phase will be required to be completed in the amount of working days described in the contract. Working Days is defined as the continuous number of days allowed for each individual bid phase to be substantially completed where the start of the Working Days is the day stakes are placed by the engineer at the request of the contractor.
2. Work within Devils Lake Airport
   a. Work occuring with the Devils Lake Regional Airport (T154N R64W S32) shall follow and comply with the requirements and restrictions of the Devils Lake Municipal Airport Authority. Contractor to coordinate all work, including but not limited to, site visit(s), staging, mobilization, fusing, boring, excvating, cleanup, restoration, etc. with Owner and Engineer.

B. Work Sequence:

1. Base Bid 3
   a. Base Bid 3 Work shall be Substantially Complete prior to work commencing on any other Base Bid or Alternate.
   b. Base Bid 3 Work shall be completed in the following order:
      1) Install mainline from 16-inch pipeline tie-in location to Webster Booster tie-in location
      2) Tie-in new mainline to existing system(s) with specified fittings, valves, manhole, and related appurtenances.

3) Pig, flush, disinfect, pressure test, and sample mainline as required by Engineer.
4) Install conduit, wiring, and connection from new manhole to Webster Booster as specified by Project Drawings and Specifications

2. Base Bid 1
   a. Base Bid 1 Work shall be completed in the following order:
      1) Install mainline from tie-in location to Engineer approved location of curbstop.
   b. Tie-in new mainline to existing system and pig, flush, disinfect, pressure test, and sample mainline as required by Engineer.
   c. **Contractor shall place users online within 30 days following start of installation of each new user.**
3. Base Bid 2/Alternate 1
   a. Base Bid 2 Work shall be completed in the following order:
      1) Install mainline as specified by Project Drawings and Specifications and Engineer staking in field.
      2) Tie-in new mainline to existing system and pig, flush, disinfect, pressure test, and sample mainline as required by Engineer.
      3) Install two (2) new users included in Base Bid 1 connected to new Base Bid pipeline
4. Alternate 2
   a. Alternate 2 Work shall be completed in the following order:
      1) Install mainline from Webster Booster tie-in to tie-in location in T149N-R6W-S3.
      2) Coordinate with Owner and Engineer to perform all carry overs starting in T154N-R63W-S3 and working towards the Webster Booster.
5. Alternate 3A/B
   a. Alternate 3 Work shall be completed in the following order:
      1) Install mainline from South Booster tie-in to tie-in location in T149N-R62W-S27.
      2) Tie-in new mainline to existing system and pig, flush, disinfect, pressure test, and sample mainline as required by Engineer.
6. For pipeline installation in cultivated areas, Contractor shall replace, compact, and level top soil as part of Substantial Completion requirements. The pipeline installation's backfilling, compaction, and grading shall be completed within one (1) mile of ongoing project pipeline installation. Prior to mobilizing to a new location backfilling, compaction, and grading shall be completed. Such aforementioned restoration work shall be completed within one (1) week of installation. Owner and Engineer reserve the right to halt pipeline installation work if restoration work is required further than one (1) mile from ongoing pipeline installation. In this instance, work shall remain halted until restoration work is complete to owner and engineer satisfaction and is within one (1) mile of pipeline installation.
7. For pipeline installation in grass areas occurring in right-of-way, ditch, or other areas Contractor shall replace and compact top soil. The pipeline

installation's backfilling, compaction, and rough grading shall be completed within one mile of ongoing project pipeline installation. Prior to mobilizing to a new location backfilling, compaction, and grading shall be completed. Final landscaping and seeding shall be considered part of Final Completion. Such aforementioned restoration work shall be completed within one (1) week of installation. Owner and Engineer reserve the right to halt pipeline installation work if restoration work is required further than one (1) mile from ongoing pipeline installation. In this instance, work shall remain halted until restoration work is complete to owner and engineer satisfaction and is within one (1) mile of pipeline installation.

8. Installation of bores within a respective Base Bid or Alternate prior to the construction season in which the Base Bid or Alternate will be complete will not be acceptable as an approach to pipeline installation.
9. Contractor shall place users on-line within 30 days following start of installation of each respective distribution pipeline segment (existing or new distribution/transmission pipeline connection to user connection point). Based on this requirement, Contractor's sequence of installation, flushing, pressure testing, and disinfection must be approved prior to proceeding with the Work within each respective Base Bid or Alternate. Once approved by Owner and Engineer, Contractor shall execute approved installation sequence until complete before moving to the next scheduled Work area within a respective Base Bid or Alternate.

C. Unless specifically noted otherwise, the status of a given pipeline shall be defined as "operational" OR "on-line" when it is capable of meeting the Owner's customer's demands for treated drinking water in terms of the required quantity and quality of treated water.

D. Work Sequence and Constraints:

1. Utilize description of critical events in this Section as a guideline for scheduling and undertaking the Work.
2. Construct Work in logical phases as required to accommodate Owner's occupancy and operations.
3. Contractor shall schedule and conduct construction to insure Owner's continual use of the system with minimal interruption.
4. During the construction period, coordinate construction schedule and operations with the Owner and Engineer.
5. To meet anticipated water demand and water quality objectives, it is imperative that the contractor is successful at completing portions of the project according to the project completion dates.
6. Work sequence and constraints presented do not include all items affecting completion of the Work but are intended to describe critical events necessary to minimize disruption of the existing system and meet Owner's service goals.
7. Refer to Section 01 31 13 - Project Coordination and 01 33 00 - Submittal Procedures.

1.04 INTERRUPTION OF OPERATIONS

A. Execute the Work while the existing system is in operation as specified in this Section and other Sections and indicated on the Drawings.

B. Indicate required shutdown of existing system pipeline segments or interruption of existing operations on Progress Schedule. Reference existing pipeline segments by Drawing number.

C. Submit notification to Owner of required shutdown of existing system pipeline segment at least seven (7) days prior to the planned date of shutdown.

D. Evaluate the request based on the Owner's ability to reliably meet capacity demands.

E. Do not begin interruption or alterations of existing pipeline segments until Engineer's written permission has been received.

F. Minimize shutdown times by thorough advanced planning. Have required equipment, materials, and labor on hand at time of shutdown and through completion of the Work.

G. Where required to minimize operational interruptions while complying with specified sequencing constraints, provide temporary pumping, power, lighting, and safety devices as necessary.

1.05 SHUTDOWN CONSTRAINTS

A. Existing Waterline Line shutdowns

1. The maximum time that an existing transmission or distribution pipeline may be offline during a single shutdown is four (4) hours during normal operating hours, as defined as between the hours of 8:30 a.m. and 4:30 p.m, Monday through Thursday, excluding federal holidays. Shutdowns will not be permitted outside of normal operating hours. All existing users must be back online between the hours of 4:30 p.m. and 8:30 a.m. Coordinate with Owner and Engineer a minimum of seven (7) days prior to taking an existing transmission line out of service. Owner reserves the right to change the shutdown date and time for transmission lines if the existing system is stressed due to high distribution flows, the Contractor fails to follow request procedures, or other considerations cannot be met. Contractor shall allow 48 working hours between approval and shutdown for operator preparation.

1.06 UTILITIES

A. Contractor shall provide advance notice and utilize services of ND One Call for location and marking of underground utilities operated by utility agencies other than the Owner.

B. Maintain electrical, telephone, water, gas, sanitary facilities, and other utility services to existing GRWD system customers should Work effect existing utilities. Provide temporary utilities when necessary.

1.07 WORK BY OTHERS

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

B. Do not interfere with the day-to-day operation and maintenance of the GRWD distribution system by the Owner.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 NOT USED

END OF SECTION 01 12 16

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SECTION 01 14 00
WORK RESTRICTIONS

GENERAL

1.01 SUMMARY

A. This Section includes:

1. Special Provisions.
2. Contractor Use of Site and Premises.
3. Owner Occupancy Requirements.
4. Road Restrictions.
5. Other Construction Requirements.

1.02 SPECIAL PROVISIONS

A. In addition to the liquidated damages as stated in Section 00 52 16 – Agreement, Contractor will also be responsible for payment of any legitimate claims made by other parties (i.e., other contractors, residents, etc.) within the area who have incurred a loss as a result of Contractor's construction practices or failure to complete the Work of this project by the specified completion date(s).

B. Contractor will not be entitled to any compensation for causes resulting in delays or hindrances to the Work. Extensions of the Project Work Period will be granted for unavoidable delays, which in the opinion of the Engineer are clearly beyond the control of the Contractor. Unavoidable delays include, but are not limited to, acts of God or the public enemy, acts of the Owner, fires, floods, epidemics, quarantine restrictions, strikes, and freight embargoes. See paragraph 1.06 of this section for full conditions of extensions.

C. It shall be the Contractor's responsibility to follow OSHA standards for all Work.

D. All incidental damages to streets, driveways, berms, etc., due to Contractor's construction techniques shall be repaired at the Contractor's expense prior to making final payment.

E. Traffic signs affected by construction activity shall be removed, stored, and replaced by Contractor. Temporary replacement signs shall be erected as required. Damage or lost signs as a result of the Project shall be replaced by the Contractor and the replacement cost shall be considered incidental to the Contract.

F. Contractor shall obtain such permits and licenses that are required for completion of the Work. Permits include, but are not limited to;

1. National Pollutant Discharge Elimination System (NPDES) Storm Water Permit.

1.03 CONTRACTOR USE OF SITE AND PREMISES

A. Limit use of Site and premises to allow:

1. Owner occupancy.
2. Work by Others.

B. Contractor shall perform all undergroundwork between the hours of 7 am to 7 pm, Monday through Friday. Underground work, including but not limited to excavating, trenching, digging, boring, backfilling, shoring, bracing, etc., outside of these hours is expressly prohibited without previous written authorization from the Owner or Engineer. Owner reserves the right to withhold compensation for underground work installed outside of working hours as defined above.

C. Owner will occupy and utilize the existing distribution system during entire period of construction and shall operate as required to meet the water demands of its customers at all times without rationing. Work shall be completed with only limited interruption.

D. Maximum scheduled down time during normal operating hours shall be four (4) hours during normal operating hours, as defined as between the hours of 8:30 a.m. and 4:30 p.m, Monday through Thursday, excluding federal holidays. Shutdowns will not be permitted outside of normal operating hours. All existing users must be back online between the hours of 4:30 p.m. and 8:30 a.m. Coordinate with Owner and Engineer a minimum of seven (7) days prior to taking an existing transmission line out of service. Owner must approve shutdown schedule a minimum of 48 hours in advance of anticipated shutdown and may deny schedule if anticipated daily production requirements or other considerations cannot be met during normal operating hours.

E. Coordinate performance of all Work with Owner operations.

F. The new distribution pipelines must be operational prior to making special connections to existing water system. The distribution system shall be disinfected in accordance with Section 33 01 10 - Disinfection of Water Utility Distribution System prior to making connections to existing users.

G. Coordinate use of premises under direction of Engineer. Contractor shall confine construction equipment, storage of materials and equipment and operations of workmen to areas permitted by law, ordinances, permits, or requirements of Contract Documents, and shall not unreasonably encumber premises with construction equipment or other materials or equipment.

H. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

I. Move any stored products, under Contractor's control, which interfere with operations of the Owner, public transportation, or property owners.

J. Contractor shall obtain and pay for use of storage or work areas needed for operations.

K. Contractor shall assume full responsibility for the protection and safekeeping of equipment, products, and materials stored on site.

L. Contractor shall notify and coordinate with Police Department, Fire Department, and Hospital/Ambulance Services. Notice shall include work schedule as construction proceeds, when work affects or obstructs intersections and streets, and when work is completed or suitable access is available in streets and intersections.

M. Contractor shall provide the name, address, and telephone number of person who has access to equipment and is authorized to make emergency repairs to Contractor's work, such as to correct trench cave-ins, move excavated material, and correct other problems during weekends and off-work hours, so access can be maintained for firefighting equipment, and to maintain barricades for public safety.

N. The Contractor must be satisfied through personal examination of the Site(s) as to all local conditions affecting their performance of the Contract. The Contractor is deemed to accept such conditions as found to exist.

O. The Contractor shall preserve all monuments, benchmarks, reference points, and stakes. In case of destruction thereof, the Contractor will be charged with expense of replacement and shall be responsible for any mistake or loss of time that may be caused. Permanent monuments or benchmarks which must be removed or disturbed shall be protected until properly referenced for relocation. The Contractor shall furnish materials and assistance for the proper replacement of such monuments or benchmarks.

P. Contractor shall notify and coordinate with right-of-way and easement owners. Notice shall include Work schedule as construction proceeds, when Work affects or obstructs intersections and streets, and when Work is completed or suitable access is available in streets or intersections.

Q. Contractor shall notify and coordinate all Work within the BNSF, CP, RRVW, or other applicable railroads right-of-way. Refer to above and to Section 00 73 00 for additional explanation of Contractor requirements.

R. Damaged Property:

1. Patch and or clean existing improvements and restore damage of property on, or adjacent to the Site(s) occasioned by the Work, including but not limited to, lawns, walks, driveways, roadways, curbs, pavements, structures, and utilities which are cut or damaged by operations and are not designated for removal, relocation, or replacement in the course of construction.
2. If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Owner. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
3. Provide written acceptance of restoration by authority or Owner.

S. Existing Facilities:

1. The Contractor shall take all necessary field measurements affecting all existing construction, piping, and equipment in this Contract and shall be solely responsible for proper fit between all Work under the Contract and existing structures, piping, and equipment.
2. Dimensions given on the drawings related to existing structures are based upon existing construction record drawings and it shall be the responsibility of the Contractor to verify the accuracy of all dimensions shown for existing structures, piping, and equipment. Any discrepancies shall be brought to the attention of the Engineer prior to the start of new construction or ordering of any materials. Contractor shall be responsible for any materials ordered that will not fit due to the failure to verify any discrepancies of existing structures, piping, and equipment prior to the start of new construction.

T. Existing Utilities:

1. Existing underground utilities, as shown on the drawings, are located in accordance with available data but locations shall be determined by the Contractor prior to beginning construction. A utility locate is required prior to any excavation.
2. Contractor shall protect all existing utilities and provide temporary removal and replacement or relocation as required for completion of the Work in the contract documents. No additional payment shall be made for this work.
3. Existing utilities not shown on the drawings and requiring relocation shall be exposed by the Contractor without damage. If damaged, the Contractor shall bear the responsibility and cost of repair or replacement.

U. Environmental Resources:

1. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this Contract. Confine activities to areas defined by the contract documents.
2. Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the Owner. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
3. Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using other approved techniques.
4. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's activities. Maintain temporary erosion and sediment control measures such as fencing, berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.

5. See Section 01 50 00 - Temporary Facilities and Controls for additional requirements.

1.04 OWNER OCCUPANCY REQUIREMENTS

A. Owner will utilize the existing water distribution system during the entire period of construction and shall operate their WTPs as required to meet the demands of its customers at all times. Ensure that portions of Work undertaken can be completed to meet this requirement. Cleanliness is crucial and the Contractor shall maintain a clean and orderly site at all times.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations. Schedule all Work to accommodate this requirement. No interruption will be permitted which adversely affects the degree of service the Owner provides. Contractor shall provide temporary facilities and make temporary modifications as necessary to keep the facilities in operation during the construction period.

C. Facility or Transmission Line shutdown time (if required for construction), if needed, during normal operating hours shall be pre-scheduled with Owner. Contractor must submit shutdown request in writing to Owner a minimum of seven (7) days in advance. Contractor shall allow 48 working hours between approval and shutdown for operator preparation. Owner may deny schedule if:

1. Contractor fails to follow request procedures.
2. Anticipated daily production requirements cannot be met during normal operating hours.
3. Other considerations cannot be met.

D. Work requiring planned facility shutdown, once undertaken, must be substantially completed to permit restart of facility within scheduled time. Critical Work elements may require continuous, non-stop work during or throughout the night to complete within schedule.

E. Pre-plan, schedule, coordinate, and stage for required materials, manpower, contractors, subcontractors, etc. to complete critical elements of Work.

F. Existing materials and equipment removed and not reused as part of the Work, and not identified elsewhere in the contract documents for salvage, shall be properly disposed of by the Contractor at no additional cost to Owner.

G. Owner must approve all proposed pipeline connections. Coordinate with Owner and Engineer a minimum of seven (7) days prior to taking an existing distribution line out of service. Owner may deny schedule if anticipated daily production requirements or other considerations cannot be met during normal operating hours, as defined as between the hours of 8:30 a.m. and 4:30 p.m, Monday through Friday, excluding federal holidays.

1.05 ROAD RESTRICTIONS

A. Contractor shall take road restrictions into consideration. Road restrictions shall not be used as an excuse for missing deadlines and Contractor shall take road

restrictions into consideration in preparing their lump sum bid price.

1.06 OTHER CONSTRUCTION REQUIREMENTS

A. Special Work Request

1. Saturday and Sunday work is allowed for the purposes of clean-up work only (no underground work shall be allowed) by the Contractor without prior written approval from the Engineer or Owner. Work shall not start on Saturday or Sunday before 8:00 am.
2. If the Contractor plans to conduct work other than clean-up work, the Contractor shall submit a Special Work Request to the Engineer and Owner for written approval. Engineer shall provide the Contractor with the appropriate form. All request shall be made at least two (2) weeks in advance of scheduled work. Engineer/Owner reserves the right to refuse Special Work Requests.
3. Special Work Request restrictions shall apply for Federal observed holidays. Contractor shall submit a Special Work Request if work is scheduled for these dates.

B. Initial Site Clean up

1. Contractor shall replace, compact, and level top soil as part of Substantial Completion requirements. The pipeline installation's backfilling, compaction, and grading shall be completed within one (1) mile of ongoing project pipeline installation. Prior to mobilizing to a new location backfilling, compaction, and grading shall be completed. Landscape final landscaping and seeding shall be part of Final Completion. Such work shall be completed within one (1) week of installation. Owner and Engineer reserve the right to halt pipeline installation work if restoration work is required further than one (1) mile from ongoing pipeline installation. In this instance, work shall remain halted until restoration work is complete to owner and engineer satisfaction and is within one (1) mile of pipeline installation.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 14 00

SECTION 01 21 13
ALLOWANCE

GENERAL

1.01 SUMMARY

A. Section includes:

1. Items Deliverable to Owner

B. Related Sections include:

1.02 ITEMS DELIVERABLE TO OWNER

A. Incidental Items

1. This list is means of assistance with incidentals deliverable to the Owner. This is not meant to be an all-inclusive list, rather provided as a convenience to the Contractor.
2. Specification Section 10 14 00 - Signs.
   a. Provide 10 additional decals of each type to Owner as spare parts.
   b. Provide one post puller and utility marker driver to Owner.
3. Specification Section 33 10 00 - Water Utilities.
   a. Provide two (2) long operating wrenches of sufficient length for operating gate valves to Owner.
   b. Provide two (2) pentagon key, two (2) short shut off wrenches for use with extensions, and two (2) long shut off wrenches for use without extensions, of proper size and length for 1-inch flush/air blowoff and residential curb stop operation.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 21 13

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SECTION 01 22 00
UNIT PRICE MEASUREMENT AND PAYMENT

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Measurement and payment criteria applicable to unit price Work.
2. Defect assessment and non-payment for rejected Work.

B. Related Sections:

1. Division 31 – Earthwork.

1.02 AUTHORITY

A. The Engineer and Owner will make final determinations regarding the completeness of Work, and subsequent payment of such Work.

B. The Engineer and Owner will take all measurements and compute quantities accordingly.

C. Contractor shall assist by providing necessary measurements, supporting data, and field data as required.

1.03 BID ITEMS

A. Quantities indicated in the Bid Form are for Bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit prices contracted.

C. No other items of Work required by the Drawings or Specifications shall be measured or paid for separately, but shall be included as part of the listed item to which the Work pertains. Failure to list all such related Work in the following descriptions of items shall not invalidate this stipulation nor relieve the Contractor from his obligation for such Work.

1.04 PAYMENT

A. Payment Includes: Full compensation for all required mobilization, bonding, insurance, labor, skill, products, tools, equipment, transportation, services, incidentals, erection, application and installation of the Work; submittal of shop drawings, product data and operation and maintenance data or manuals, record data, start-up and system demonstration, where required; warranties, overhead and profit.

B. All items shall include traffic control, protection of the public, flag persons, construction signs, fences, barricades, transportation and disposal of excavated material, erosion control and stormwater pollution prevention, and cleaning,

repair, and maintenance of haul routes.

C. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit price for Work which is incorporated in or made necessary by the Work.

1.05 DEFECT ASSESSMENT

A. Replace the Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work may remain, but the price will be adjusted to a new price at the discretion of the Engineer and Owner.
2. The defective Work will be partially repaired to the satisfaction of the Engineer and Owner, and the price will be adjusted at the discretion of the Engineer and Owner.

C. The authority of the Engineer and Owner to assess the defect and determine payment adjustment is final.

1.06 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected Products.

1.07 CHANGES IN PLAN QUANTITY

A. Plan quantities are based on assumed existing conditions and/or as stated in payment sections or notes. An increase or decrease from the number of units shown in the Bid Form shall not cause a change in the unit price except as allowed by the General Conditions.

1.08 DESCRIPTION OF UNIT PRICES FOR BASE BID - PIPELINE CONSTRUCTION:

THE FOLLOWING DESCRIPTIONS ARE APPLICABLE TO THE BASE BID AND ALL ALTERNATES. NOTE THAT SOME UNIT PRICE BID ITEMS ARE APPLICABLE ONLY TO THE BASE BID AND/OR CERTAIN ALTERNATES; REFER TO BID FORM FOR UNIT PRICE BID ITEMS THAT ARE APPLICABLE TO THE BASE BID AND EACH ALTERNATE.

A. **Mobilization, Lump Sum (l.s.):**

1. This item shall consist of all Work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to and from the Project site; temporary lighting for construction; for the establishment and subsequent removal of all

offices and storage facilities, Contractor's buildings, and other facilities necessary for Work on the Project; and for all bonding, insurance (excluding Railway Protection Insurance), licenses, fees, permits, and for all other Work and operations which must be performed, or costs incurred, prior to beginning and after completion of Work on the various items on the Project site.

2. When partial payments are made on the contract, payment for mobilization will be made according to the following schedule.
    a. When 5 percent of the original contract is earned, 25 percent of the amount bid for mobilization will be paid.
    b. When 10 percent of the original contract is earned, 50 percent of the amount bid for mobilization will be paid.
    c. When 25 percent of the original contract is earned, 60 percent of the amount bid for mobilization will be paid.
    d. When 65 percent of the original contract is earned, 90 percent of the amount bid for mobilization will be paid.
    e. When 80 percent of the original contract is earned, 100 percent of the amount bid for mobilization will be paid.

B. **Water Main; linear foot (l.f.):** Unit price includes, but not limited to, all cost for furnishing; handling; laying; materials; pipe; pipe fittings; fusing; act of fusing; and associated fittings; saddles and tapping saddles; special placing of bedding materials; removal and replacement of topsoil; trench excavation; dewatering; sheeting; shoring; bracing; backfilling with job excavated material or select backfill; compacting, compaction testing; flushing; leakage and hydrostatic pressure testing; sterilization; disinfection; poly-pigging, recording as-built information; utility repair of utilities damaged by Contractor's operation; coordination of utility relocation by the utility; connections to existing and new water main; thrust blocking of reaction backing; pipe restraints and associated fittings; surface restoration; flag persons; warning lights; and barricades. Includes removal, transportation, and disposal of excess excavated material and cleaning, repair, and maintenance of haul routes. Includes length of pipe within boring and receiving pits. Aggregate bedding, if required or chosen by the Contractor to be installed, shall be included in the unit price for various pipe sizes and material types listed in the Bid Form. Length will be measured along centerline of pipe with no deduction for fittings or valves.

1. Owner will hold a minimum of 5% retainage until completion of filling, flushing, and disinfection.
2. Payment will be made for various sizes, types, and classes listed in the Bid Form.

C. **Directional Bores; linear foot (l.f.):** Unit price includes, but not limited to, all costs for furnishing; handling; installing; pipe; pipe materials including fusing and act of fusion; couplers; all other associated pipe materials; labor, tools, and equipment to bore and install pipeline; removal and replacement of topsoil; excavation; boring pits; receiving pits; removal of rocks; dewatering; sheeting; shoring; bracing; backfilling with job excavated material or select backfill;

compaction and compaction testing; flushing; leakage and hydrostatic pressure testing; disinfection; recording as-built information; utility repair of utilities damaged by Contractor's operation; coordination of utility relocation by the utility company; surface restoration; and flag persons, warning lights, and barricades. Includes removal, transportation, and disposal of excess excavated material; import of select backfill, if excavated material is unsuitable for compaction; cleaning, repair, and maintenance of haul routes; rock or other obstructions encountered during bores are incidental to contract, including large rock, cobble, and shale. Varying soil conditions (sand, rocks, etc.) encountered during the boring process shall be incidental to the cost. Payment will be made for various sizes listed in the Bid Form. Pay length shall be predetermined by Engineer as measured between the wooden lath installed by Engineer/Owner prior to pipeline installation. Payment shall include the costs for verification of the horizontal and vertical alignments shown on the Drawings. Payment shall be made for successfully completed Directional Bores. Defective bores, including bore hole abandonment and the costs to verify the alignments shown on the Drawings, shall not be measured for payment. All end connections within PVC pipeline installations shall be made with 4-foot or 8-foot PVC repair couplers as specified based on the length of the directional bore. All end connections within Poly pipeline installation shall be fused. Couplers not allowed within Poly pipeline installation without Owner and Engineer approval.

D. **Cased RR & Highway Bore; lump sum (l.s.):** Lump sum price includes, but not limited to, all costs for labor, tools, materials and equipment to push, jack, and bore; removal and replacement of topsoil; excavation; boring or jacking pits; intermediate connection or inspection pits; receiving pits; dewatering; sheeting; shoring; bracing; backfilling; carrier Poly pipe of sizes and materials labeled on Drawings; fusion and act of fusing; steel Sch 40 casing pipe of sizes labeled on drawings; compaction and compaction testing; synthetic rubber pull-on end seal, stainless steel clamps, casing spacers, leakage and hydrostatic testing; utility repair of utilities damaged by Contractor's operation; completing, submitting, coordinating and paying for the Rail Road “Request for Inspector Coordinator and Flagging Field Services, flag persons; purchasing and providing Railroad Protective Liability Insurance as required, warning lights; barricades; coordination with railroad; and incidental work. Includes removal, transportation, and disposal of excess excavated material and cleaning, repair, and maintenance of haul routes. Payment will be made for the unit price lump sum listed in the Bid Form for the railroad bore shown on the Drawings. All end connections within PVC pipeline installations shall be made with 4-foot or 8-foot PVC repair couplers as specified based on the length of the cased bore. All end connections within Poly pipeline installation shall be fused. Couplers not allowed within Poly pipeline installation without Owner and Engineer approval.

E. **Fittings; each (ea.):** Unit price includes, but not limited to, all cost for furnishing; handling; laying; setting; materials; labor, tools, equipment, in-line

poly tees, bends, and other fittings; 5-foot Poly sticks fused to each Poly branch and run connection; repair couplers; fusing and act of fusion; removal and replacement of topsoil; excavation; removal of rocks; dewatering; sheeting; shoring; bracing; backfilling with job excavated material or select backfill; compaction and compaction testing; flushing; leakage and hydrostatic pressure testing; disinfection; recording as-built information. Payment will be made for various sizes, types, and classes listed in the Bid Form.

F. **Tie-In to Existing System; each (ea.):** Unit price includes, but not limited to, all cost for furnishing, handling and laying; materials; fusing, act of fusing, bedding materials; trench excavation; removal and replacement of topsoil; dewatering; sheeting; shoring; bracing; removal of existing water main and appurtenances; fittings; tees; reducers, saddles; hot taps; connection of pipes; connections into existing and new water mains; couplings and associated pipe materials; pipe and fittings in-line with existing mains; cathodic protection connection and specialty materials; retainer glands; restraints; polyethylene encasement; concrete thrust blocking; concrete base; bedding materials; special placing of bedding materials; backfilling with job excavated material or select backfill; compacting and compaction testing; leakage and hydrostatic pressure testing; sterilization; maintaining water service; recording as built information; utility repair of utilities damaged by Contractor's operation; coordination of utility relocation by the utility; flag persons; warning lights; and barricades. Includes removal, transportation, and disposal of excess excavation, material and cleaning, repair, and maintenance of haul routes. Payment will be made for various sizes and configurations listed in the Bid Form and as depicted in the Drawings.

G. **Gate Valves; each (ea.):** Unit price includes, but not limited to, all cost for: furnishing; handling; laying, setting; materials; fusing; act of fusing; valves, riser and cover; retainer glands; restraints; trench adapters; polyethylene encasement; sign post and various marker signs as shown on the plan sheets; operating wrenches; bedding materials; special placing of bedding materials; removal and replacement of topsoil; trench excavation; dewatering; sheeting; shoring; bracing; backfilling with job excavated material or select backfill; compacting, compaction testing; leakage and hydrostatic pressure testing; disinfection; recording as-built information; utility repair of utilities damaged by Contractor's operation; coordination of utility relocation by the utility; connections to existing and new water main; resting block; surface restoration; flag persons; warning lights; and barricades. Includes removal, transportation, and disposal of excess excavated material and cleaning, repair, and maintenance of haul routes. Payment will be made for various sizes listed in the Bid Form.

H. **1-inch Flush/Air Blowoff Valve; each (ea):** Unit price includes, but not limited to, all cost for furnishing hydrant, isolation valve, and appurtenances as shown on the drawings; handling; laying; and installing materials, valve, and restraints; concrete thrust blocking; concrete base; tapping saddle; polyethylene pipe; connections to new water main including fittings; tee post; riser and cover;

polyethylene encasement; operating wrenches; bedding materials; special placing of bedding materials; removal and replacement of topsoil; removal of rocks; trench excavation, sheeting, shoring, dewatering and bracing; backfilling with job excavated material or select backfill; compacting and compaction testing; leakage and hydrostatic pressure testing; disinfection; recording as-built information; utility repair of utilities damaged by Contractor's operation; coordination of utility relocation by the utility; resting block; surface restoration; maintaining water service; flag persons; warning lights; and barricades. Includes removal, transportation, and disposal of excess excavation, material and cleaning, repair, and maintenance of haul routes.

I. **Pressure Reducing Valve (PRV) with manhole (i.e. Webster PRV Manhole and 2-inch PRV Manhole); each (ea.):** Unit price includes all cost for supplying, handling, laying, and setting materials, piping; fittings; PRV; valves; water meter (where specified); pressure transducer assembly including but not limited to fittings, pipe, pipe saddles, ball valves, nipples, block and bleed valves; applicable PVC, polyethylene, or Concrete manholes as specified; manhole body, riser, and cone; adjusting rings; mastic; casting and cover; lid; laddder; penetrations; mounting brackets, equipment, and parts; sump pump and piping; sump pump discharge screen; marker posts; insulation; internal components, fittings, and appurtenances; standard steel posts; concrete; painting; trench excavation; dewatering; sheeting; shoring; bracing; thrust blocking or reaction backing; bedding/base materials; special placement of bedding materials; backfilling with job excavated or select backfill; including removal, transportation, and disposal of excess excavated material; import of select backfill (if excavated material is unsuitable for compaction or as specified); and cleaning, repairing, and maintaining haul routes; compaction testing; flushing; leakage and hydrostatic pressure testing; disinfection; bacteria testing; recording as-built information; utility repair of existing utilities damaged by contractor’s operation; and appurtenances for a complete operating system.

J. **Webster Manhole Electrical, Instrumentation, and Controls, lump sum(l.s.):** Unit price includes all costs for electrical, instrumentation, and controls for work associated with the Webster PRV Manhole and its related connection of electrical, instrumentation, and conctrols to the existing Webster Booster.

K. **Seeding; acre (ac.):** unit price includes all cost for: furnishing, handling; materials; seed; black dirt topsoil preparation; fertilizer; equipment and incidentals for re-establishing lawns, berms, roadway ditches, and other grass areas disturbed by construction activity.

L. **Gravel; ton (Ton):** unit price includes all costs for: labor; materials; equipment and incidentals for placing gravel in streets, alleys, driveways and roadways. Measurement computed by vehicular weight clips from certified scale for actual gravel surface placed. Payment will be made for gravel surfacing when necessitated by approved construction methods. Gravel surfacing shall be

measured and paid only when prior authorization is given by Engineer.

M. **1-inch Residential Curb Stop Valve; each (ea.):** Unit price includes, but not limited to, all cost for furnishing; handling; laying; setting; materials; fusing; act of fusing; curb stop; riser; blow-off tubing; bedding materials; special placing of bedding materials; removal and replacement of topsoil; trench excavation; dewatering; sheeting; shoring; bracing; backfilling with job excavated material or select backfill; compaction and compaction testing; leakage and hydrostatic pressure testing; disinfection; recording as-built information; utility repair of utilities damaged by Contractor's operation; coordination of utility relocation by the utility; connections to existing and new water main; concrete base; surface restoration; flag persons; warning lights; and barricades. Includes removal, transportation, and disposal of excess excavated material and cleaning, repair, and maintenance of haul routes.

N. **Residential Meter Setter Unit; each (ea.):** Unit price includes, but not limited to, all costs for furnishing, shipping, handling, and providing, direct to Owner, a completely assembled residential meter setter unit as depicted in the Drawings, including the water meter with remote readout and wire; radio meter reading unit, pressure reducing valve; tandem meter setter; backflow preventer; ball valves; flow control valves; pressure gages; fittings and reducers; and clamps.

O. **Frost Proof Residential Meter Pit; each (ea.):** Unit price includes, but not limited to, all cost for furnishing, shipping, handling, and installing a completely assembled frost-proof meter pit assembly as depicted in the Drawing Details, including PVC riser with sealed cover, insulation plug assembly with handle, 4-inch x 4-inch x 6-foot pressure treated post and post installation, pressure reducing valve, tandem meter setter, backflow preventer, ball valves, flow control valves, pressure gauges, and fittings and clamps; bedding materials; special placing of bedding materials; removal and replacement of topsoil; trench excavation; dewatering; sheeting; shoring; bracing; backfilling with job excavated material or select backfill; gravel; compacting; compaction testing; leakage and hydrostatic pressure testing; disinfection; maintaining water service; recording as-built information; utility repair of utilities damaged by Contractor’s operation; coordination of utility relocation by the utility; connections to existing and new water main; surface restoration; flag persons; warning lights; and barricades. Unit price also includes providing one (1) water meter per residential meter setter unit criteria as referenced and depicted on the Drawing Details with submersible rating, radio meter reading unit, remote readout and wire directly to Owner for each frost-proof meter pit installed. The provided meter will be installed by Owner in the future.

P. **Restoration; linear foot (l.f.):** Unit price includes, but not limited to, all costs for labor; material; equipment for replacement of spoil piles; replacement of topsoil; final grading of the areas disturbed by construction activities during pipeline installation; repair and/or replacement of fences disturbed during construction;

removal and disposal of rocks, wastes, and unused construction materials; and generally restoring properties to pre-construction condition. Restoration is to be deemed acceptable at the Engineer and Owner's discretion prior to payment of this line item. Contractor will not be compensated for this line item until all Restoration of disturbed areas within each Project Zone is acceptable and approved by Owner and Engineer. Upon Owner and Engineer acceptance and approval, a single lump sum payment will be made for Restoration Work within each Project Zone, respectively. This line item is directly tied to the lineal feet of installed open cut pipeline within each Project Zone, and payment will be made based on "fixed" unit price listed in the Bid Form.

Q. **Pavement Repair and Patching; square yard (s.y.):** Unit price includes all costs for labor; tools; materials; equipment for saw cutting, removing, transporting, and disposing of existing pavement; aggregate base material; labor, material, and equipment for pavement at the minimum thickness indicated oin the contract documents, including subgrade preparation and compaction; testing; concrete; asphaltic pavement materials; formwork; reinforcement; expansion materials; finish Work; curing; jointing; and protection;and cleaning, repair, and maintenance of haul routes. Measurement will be made of actual area of pavement removed and replaced, subject to the limitations outlined as follows:

1. Quantities of surface removed will be calculated as the actual quantity of surface within the defined surface removal width.
2. No payment will be made for pavement removed outside the tabulated limits.
3. Extra pavement removed shall be paid for only when prior authorization is given by Engineer.

1.09 CHANGES IN PLAN QUANTITY

A. Plan quantities are based on assumed existing conditions and/or as stated in payment sections or notes. An increase or decrease from the number of units shown in the Bid Form shall not cause a change in the unit price except as allowed by the General Conditions.

1.10 INCIDENTAL ITEMS

A. Work required by the Contract Documents but not listed as a bid item shall be considered incidental to the Contract.

B. Clean-up and restoration of all Work areas, storage areas, and traffic and haul routes shall be considered incidental to the Contract, and shall be performed as required by the Contract Documents or as directed by the Engineer.

C. Repair of new and existing surfaces or features damaged by Contractor's Work operations shall be performed incidental to the Contract, and shall consist of restoration in-kind to the satisfaction of the Engineer.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 22 00

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SECTION 01 23 00
CONTRACT CONSIDERATIONS AND ALTERNATES

GENERAL

1.01 SUMMARY

A. Section includes:

1. Schedule of Values.
   a. Alternates.
   b. Schedule of Alternates.

B. Related Sections include:

1. Division 31 – Earthwork.

1.02 SCHEDULE OF VALUES

A. Submit:

1. Typed schedule of values in format similar to EJCDC Application for Payment (form EJCDC C-620, 2018 Edition).
2. In duplicate within 15 days after date of Owner-Contractor Agreement.
   a. Engineer will review Schedule of Values and provide revision comments to Contractor within 10 days of receipt from Contractor.
   b. Intent of Engineer's review will be to ensure format follows tracking and verification requirements per Project Base Bid/Alternate and to coincide with Project completion dates.

B. Format:

1. Utilize the Line Item Bid Tab items within Contract Documents.
2. Identify line items corresponding with number and title of Specification Section, as necessary.
3. Identify site mobilization, bonds, and insurance, as necessary.

C. Revise Schedule of Values to list approved Change Orders, and submit with each Application for Payment.

1.03 ALTERNATES

A. Owner has complete authority to accept or reject any and/or all alternate bids. Alternates quoted on the Bid Form will be reviewed and accepted or rejected at the Owner's option. Alternates with an 'A' or a 'B' option will award the 'A' option only or the 'A' and 'B' options if the corresponding alternate is accepted for award. Alternates with 'B' designation will not be awarded without award of the corresponding 'A' option. The Work is generally described as follows: Bidders shall allocate all costs for construction of each Alternate in the appropriate bid form line item.

B. Accepted Alternates will be identified in the Owner-Contractor Agreement.

C. Coordinate related Work and modify surrounding Work as required to accommodate Alternate(s) selected.

D. Alternate Bid items shall include all Work and materials necessary for proper installation of the Alternate items.

E. Refer to the applicable Specifications and Drawings for the respective Alternates as identified in Section 01 10 00 - Summary of Work.

1.04 SCHEDULE OF ALTERNATES

A. **Alternate No. 1 – Highway 19 Expansion (PVC):** Incremental cost difference to provide and install the following approximate quantities: 15,000 feet of 12-inch PVC SDR26 CL160 IPS pipeline in lieu of 15,000 feet of 12-inch DR 17 IPS POLY pipeline included as Work within Base Bid 2 – Highway 19 Expansion (Poly).

B. **Alternate No. 2 - Webster Transmission Expansion:** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 400 feet of 2-inch DR 11 IPS POLY pipeline, 21,500 feet of 4-inch DR 11 IPS POLY pipeline, 100 feet of 2-inch DR 11 IPS POLY directional bores, 650 feet of 4-inch DR 11 IPS POLY directional bores, one (1) 4-inch fitting, nine (9) tie-ins to existing system, eight (8) gate valves ranging in size from 2-inch to 4-inch, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.

C. **Alternate No. 3A - South System Transmission Expansion (Poly):** Construction of rural water pipelines consisting of furnishing and installing the following approximate quantities: 42,500 feet of 8-inch DR 13.5 IPS POLY pipeline, 2,600 feet of 8-inch DR 13.5 IPS POLY directional bores, six (6) 8-inch fittings, two (2) tie-ins to existing system, five (5) 8-inch gate valves, one (1) 1-inch flush/air blow-off valve, and all associated fittings and appurtenances, restoration, flushing and testing, signage, seeding, and gravel.

D. **Alternate No. 3B – South System Transmission Expansion (PVC):** Incremental cost difference to provide and install the following approximate quantities: 42,500 feet of 8-inch PVC SDR26 CL160 IPS pipeline in lieu of 42,500 feet of 8-inch DR 13.5 IPS POLY pipeline included as Work within Alternate No 3A – South System Transmission Expansion (Poly).

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 23 00

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. This section defines the procedures for proposing substitute items by "Approved Equivalent" manufacturers not listed in the specifications

B. Acceptance of "Approved Equivalent" manufacturers will be done by addendum to the bidding documents prior to bid date and time.

1.02 QUALIFICATIONS PACKAGE FOR NON-LISTED "APPROVED EQUIVALENT" PRODUCT CONSIDERATION

A. Bidders shall submit a qualification package at least ten (10) days prior to the date of receipt of bids for each proposed "Approved Equivalent" manufacturer not already listed as an acceptable or approved “manufacturer” in the specifications, which the Bidder proposes to furnish. Each qualification package shall be bound with protective cover, identified by specification section number and title, and the product manufacturer's name. The Bidder shall submit all qualification packages in a sealed, sturdy box or suitable container.

B. Qualification packages for non-listed "Approved Equivalent" items shall include the following: (if an item does not apply, indicate so in the submittal):

1. Completed Substitution Request Form. A copy of which can be found attached to the end of this section.
2. A complete set of drawings, specifications, catalog cut-sheets, and detailed descriptive material. This information shall identify all technical and performance requirements stipulated on each drawing and in each specification section. Include all items required for shop drawing review.
3. Provide marked-up product information showing side-by-side comparisons for both the specified products and proposed products
4. Detailed information for all buy-out items such as hardware, motors, bearings, reducers, belts, sheaves, motor controllers and instrumentation.
5. Lists showing materials of construction of all components, including all buy-out items.
6. Manufacturer's recommended spare parts, including all buy-out items.
7. Information on equipment field erection requirements including total weight of assembled components and weight of each sub-assembly.
8. A maintenance schedule showing the required maintenance, frequency of maintenance, lubricants and other items required at each regular preventative maintenance period, including all buy-out items.
9. Electrical requirements and schematic diagrams.
10. Detailed written documentation with discussion of all deviations of equipment, including buy-out items, from the Contract Documents.
11. A list of all process, mechanical, electrical, and structural changes and requirements for incorporating the "Prior Approved Equivalent" into the project.

12. A listing of the manufacturer's history. Unless specified otherwise in applicable specification sections, manufacturer's history is to demonstrate a minimum of three (3) years experience and a minimum of three (3) successful installations of the size and complexity involved in this project. Provide a complete installation list with contact names and telephone numbers.
13. Documentation easily identifying that the proposed substitution meets or exceeds the specified warranties

C. Failure to furnish the preceding information at least ten (10) days prior to the date of receipt of bids shall be cause for rejection of a proposed alternate item for use on this project.

D. No "Approved Equivalent" items will be considered unless, in the opinion of the Engineer, they conform to the Contract Documents in all respects, except for make and manufacturer and minor details.

E. The Engineer shall be the sole authority for determining conformance of a proposed "Approved Equivalent" item with the Contract Documents. Except for identification of non-compliance with the specifications, the Engineer will not be required to prove that an "Approved Equivalent" item is not equal to "Basis of Bid" items.

F. Substitutions or modifications to the qualification package will not be considered after opening of Bids.

G. Acceptance of "Approved Equivalent" items and their qualification packages, does not eliminate the need for shop drawing submittals and reviews during construction, nor does it eliminate the requirement that the seller satisfy the requirements of the Contract Documents.

1.03 BID REQUIREMENTS

A. Bidders proposing to furnish "Approved Equivalent" items that require changes to the Contract Documents shall notify the Engineer in writing of all process, mechanical, electrical and structural changes and requirements for incorporating the "Approved Equivalent" into the Project and shall reimburse the Owner for associated redesign costs. Redesign and contract drawing revisions to accommodate the "Approved Equivalent" will be prepared by the Engineer during the shop drawing review process. Reimbursement shall be based on the Engineer's standard hourly rates plus reimbursable expenses at cost.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 NOT USED

ATTACH SUBSTITUTION FORM AS PDF

END OF SECTION 01 25 00

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SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

GENERAL

1.01 SUMMARY

A. Section includes:

1. Submittals.
2. Documentation of Change in Contract Price and Contract Time.
3. Change Procedures.
4. Work Change Directive.
5. Stipulated Price Change Order.
6. Time and Material Change Order.
7. Execution of Change Orders.
8. Correlation of Contractor Submittals.

B. Related Sections include:

1.02 SUBMITTALS

A. Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Change Order Forms: Engineers Joint Contract Document Committee (EJCDC) form EJCDC C-941 (2018 Edition).

1.03 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

A. Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. Provide additional data to support computations:

1. Quantities of products, labor, and equipment.
2. Taxes, insurance, and bonds.
3. Overhead and profit (in accordance with provisions of Section 00 72 00 – General Conditions).
4. Justification for any change in Contract Time.
5. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs, and for work done on a time and material basis, with additional information:

1. Origin and date of claim.
2. Dates and times work was performed, and by whom.
3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.04 CHANGE PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time by issuing supplemental instructions.

B. The Engineer may issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised Drawings and specifications and a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within five (5) days.

C. The Contractor may propose a change by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

1.05 WORK CHANGE DIRECTIVE

A. Engineer may issue a document, signed by the Owner, instructing the Contractor to proceed with a change in the Work, which may require subsequent inclusion in a Change Order if any change in Contract Price or Contract Time is required.

B. The document will describe changes in the Work, and will designate method of determining any change in Contract Price or Contract Time. A work change directive will not include any change in Contract Price or Contract Time without written notice and approval by the Engineer for inclusion in a Change Order.

C. Promptly execute the change in Work.

1.06 STIPULATED PRICE CHANGE ORDER

A. Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Engineer.

1.07 TIME AND MATERIAL CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

B. Engineer will determine the change allowable in Contract Price and Contract Time as provided in the Contract Documents.

C. Maintain detailed records of work done on Time and Material basis.

D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.08 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract. The form to be used shall be that indicated in Paragraph 1.02.B of this Section. Engineer will then present the proposed signed Change Order to Owner for approval. Upon obtaining approval, the Change Order will be submitted to the Owner for signatures as provided in Conditions of Contract.

1.09 BALANCING CHANGE ORDERS

A. A Balancing Change Order will be developed and processed when the Work within each Project Alternate, respectively, is nearing completion.

B. Balancing Change Order will be created and processed to capture final installed quantity changes prior to Final Completion within each Project or Project Alternate, respectively.

1.10 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.

B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

C. Promptly enter changes in Project Record Documents.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 26 00

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SECTION 01 29 00
PROGRESS PAYMENT PROCEDURES

GENERAL

1.01 SUMMARY

A. Section includes:

1. Format and Preparation of Applications.
2. Submittal Procedures.
3. Substantiating Data.

B. Related Sections include:

1.02 FORMAT AND PREPARATION OF APPLICATIONS

A. Utilize: Engineers Joint Contract Document Committee (EJCDC) Application for Payment Form (EJCDC C-620 , 2018 Edition).

B. Preparation

1. Present required information in typewritten form.
2. Execute certification by signature of authorized officer.
3. Use data from approved Schedule of Values as defined in Section 01 23 00 - Contract Considerations and Alternates. Provide dollar value in each column for each line item for portion of work performed and for stored products. Stored products submitted for reimbursement must have a material invoice itemized to match the Bid Items listed on the Bid Form in Section 00 41 00 - Bid Form.
4. List each authorized Change Order as an extension on Continuation Sheet, listing Change Order number and dollar amount as for an original item of Work.
5. Prepare Application for Final Payment as specified in Section 01 77 00 - Closeout Procedures.

1.03 SUBMITTAL PROCEDURES

A. Submittals

1. Five (5) copies of each Application for Payment.
2. Provide an updated construction schedule with each Application for Payment.
3. Submit three (3) copies of Form A – Material Handling and Installation Certification with first Application for Payment for installed pipe. A copy of Form A can be found at the end of Section 33 10 00 - Water Utilities. Payment for any installed pipe will not be made prior to the Engineer receiving Form A.
4. Payment Periods: As stipulated in the Agreement.
5. Submit with transmittal letter as specified for Submittals in Section 33 10 00 - Water Utilities .
6. Administrative actions which must precede or coincide with submittal of final application for payment include:

a. Submit lien waivers, warranties and bonds, and project record documents with final application for payment.
b. Completion of all work not included in substantial completion as defined in General and Supplementary Conditions.
c. Completion of project closeout procedures as indicated in Section 01 77 00 - Closeout Procedures.
d. Removal of temporary facilities and services.
e. Removal of surplus materials, rubbish, or similar elements.
f. Final cleaning.
g. Transmittal of project construction record documents to Owner and Engineer.
h. Consent of surety for final payment.

B. Greater Ramsey Water District (GRWD) Board reviews payments at the regularly scheduled board meeting on the first Thursday of each month, unless the first Thursday occurs within the first three days of the month, in which case the meeting occurs on the second Thursday of the month. In order to be included with their packets for payment, all recommended Payment Applications must be submitted by the Engineer to the GRWD staff at least one week prior to scheduled meeting dates. To accommodate the payment schedule and to allow adequate time to review the monthly Payment Applications, it is recommended that the Contractor submit proposed Payment Application to the Engineer by the fourth Tuesday of the preceeding Month for which a Payment Application is being submitted. If a Payment Application is not to the Engineer prior to the fourth Tuesday, the Payment Application may not be processed during said month.

1.04 SUBSTANTIATING DATA

A. When Engineer requires substantiating information, submit data justifying dollar amounts in question.

B. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

C. Provide copies of invoice(s) for payment of materials stored. The invoices submitted for payment of materials stored must be itemized to match the Bid Items listed on the Bid Form in Section 00 41 00 - Bid Form. Payment will not be made for materials that are not stored on-site or within a bonded warehouse that has been approved by Engineer and Owner.

D. Contractor shall supply substantiating information in compliance with federal and state requirements for monthly utilization reports and weekly prevailing wage and labor rates for laborers on-site.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 29 00

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SECTION 01 31 13
PROJECT COORDINATION

GENERAL

1.01 SUMMARY

A. This Section includes:

1. Coordination and project conditions.
2. Project Schedules
3. Field engineering.

B. Related Sections include:

1.02 COORDINATION AND PROJECT CONDITIONS

A. General:

1. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
2. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
3. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
4. Coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

B. Responsibilities of the Contractor:

1. Coordinate construction schedule and operations with Owner and Engineer to accommodate Owner occupancy requirements. Utilize description of critical events in Section 01 12 16 - Work Sequence Requirements as a guideline for scheduling and undertaking the Work.
2. Contractor shall submit an initial proposed Work Schedule to the Engineer 15 days prior to the start of construction. The Work Schedule shall:
   a. Be in the form of a gantt chart with anticipated dates and duration indicated.
   b. Include all major aspects of the Work as included within the Contract Documents.
   c. Include a breakdown of each major aspect of the Work into smaller tasks with sufficient detail to explain the construction process from start to finish.
   d. Include sketches and/or drawings of critical components if required to complete or supplement a portion of the Work Schedule.

3. Contractor shall follow the Work Progress requirements as described in the Agreement and in Section 01 14 00 - Work Restrictions.
4. Contractor shall schedule and conduct construction to insure Owner's continual use of the system with minimal interruption.
5. During the construction period, coordinate construction schedule and operations with the Owner and Engineer.
6. To meet anticipated water demand and water quality objectives, it is imperative that the contractor is successful at completing portions of the project according to the project completion dates.
7. Cooperate with and coordinate Work with other Contractors and the Construction Coordinator to facilitate the general progress of the Project and to prevent delaying the progress of the other Contractors.
8. Afford other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their Work.
9. Connect and coordinate Work with other Contractors Work as required by the Contract Documents.
10. After notification by other Contractors or the Engineer of the need to accomplish a particular phase or element of the Work, the Contractor shall, within a reasonable time, perform his Work so as not to delay or impede the other Contractors.
11. Cooperate with Construction Coordinator in scheduling and performance of the Work.
12. Allocate and coordinate use of Site for field offices and construction trailers and for access, traffic, and parking facilities.
13. Instruct and coordinate the use of temporary utilities and construction facilities.
14. Coordinate the Work of the individual Contractors.
15. Submit (and revise) progress schedule in accordance with Section 01 33 00 - Submittal Procedures coordinating the entire project construction schedule.
16. Organize and submit Applications for Payment. Submit applications on EJCDC C-620 forms for review by Engineer.
17. Submit shop drawings, product data, and samples in accordance with Section 01 33 00 - Submittal Procedures.
18. Submit request for interpretation of Contract Documents and obtain instructions through Engineer.
19. Process requests for Change Orders through Engineer.
20. Organize all closeout submittals and preliminary inspection reports for transmittal to Engineer. Organize all record drawings and submit to Engineer. Review all drawings before submitting to Engineer.
21. Notify Engineer when all trades are ready for final inspection and organize Substantial and Final inspections.
22. Provide record drawing information to Engineer.
23. Ensure punch list items are completed prior to scheduling final inspection by Engineer.

1.03 FIELD ENGINEERING

A. Control datum for construction is that shown on Drawings.

B. Contractor shall locate and protect survey control and reference points.

C. Contractor shall confirm Drawing dimensions and elevations. Notify Engineer concerning errors or ambiguities.

D. Contractor shall establish and maintain required elevations, lines, and levels utilizing recognized engineering practices. Obtain services of a licensed surveyor as required to assure Work is installed per Drawing dimensions and elevations.

E. Site service utilities are shown in their approximate locations on the Drawings. Contractor shall be responsible to field verify all utility locations as required to accommodate construction activities.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 31 13

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SECTION 01 31 19
PROJECT MEETINGS

GENERAL

1.01 SUMMARY

A. This Section includes:

1. Preconstruction meeting.
2. Site mobilization meeting.
3. Progress meetings.
4. Pre-installation meetings.

B. Related Sections include:

1.02 PRECONSTRUCTION MEETING

A. Engineer will schedule a meeting at a determined location after Notice of Award.

B. Attendance required by

1. Contractor.
2. Contractor's superintendent.
3. Owner.
4. Engineer.
5. Major Subcontractor(s).

C. Agenda:

1. Contract Forms and Conditions of the Contract.
2. Distribution of Contract Documents.
3. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
4. Designation of personnel representing the parties in Contract, and the Engineer.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
6. Scheduling.
7. Use of premises by Owner and Contractor.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements of the primacy agencies including, but not limited to, the North Dakota Department of Environmental Quality.

D. Engineer will record minutes and distribute copies after meeting within fourteen (14) days to participants and those affected by decisions made.

1.03 SITE MOBILIZATION MEETING

A. Engineer and Owner will schedule a meeting at the Project Site prior to Contractor occupancy.

B. Attendance required by:

1. Contractor(s).
2. Contractor’s Superintendent(s).
3. Owner.
4. Engineer.
5. Major Subcontractor(s), if any.

C. Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements and partial occupancy.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Procedures for testing.
8. Requirements for start-up of equipment.
9. Inspection and acceptance of equipment put into service during construction period.
10. Procedures for maintaining record documents.

D. Engineer will record minutes and distribute copies after meeting within fourteen (14) days to participants and those affected by decisions made.

1.04 PROGRESS MEETINGS

A. Engineer will:

1. Schedule and administer meetings at the Project site throughout progress of the Work at weekly intervals, or as deemed necessary by the Engineer.
2. Make arrangements for hosting meetings.

B. Attendance required by:

1. Contractor
2. Contractor(s) Job Superintendent.
3. Owner.
4. Engineer.
5. Major Subcontractors and suppliers.
6. Others as appropriate to agenda topics for each meeting.

C. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding Work period.

10. Coordination of projected progress.
11. Maintenance of quality and Work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

D. Engineer will record minutes and distribute copies within seven (7) days after meeting to participants and those affected by decisions made.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 31 19

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SECTION 01 33 00
SUBMITTAL PROCEDURES

GENERAL

1.01 SUMMARY

A. This Section includes:

1. Submittal Procedures.
2. Submittal Schedules
3. Construction Progress Schedules.
4. Proposed Products List.
5. Tabulation of Subcontractors.
6. Tabulation of Suppliers.
7. Product Data.
8. Request for Interpretation
9. Shop Drawings.
10. Samples.
11. Test Reports.
12. Manufacturer's Certificates.
13. Manufacturer's Instructions.
14. Manufacturer's Field Reports.
15. Excessive Shop Drawing Reviews.

B. Related Sections include:

1. Section 01 45 00 - Quality Control.
2. Division 31 – Earthwork.

1.02 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Submit revised submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Contractor shall completely review all submittal materials prior to submission to Engineer. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

F. Engineer will attempt to complete a review of each submittal in a timely manner within 30 calendar days of receipt of each submittal. Failure of Engineer to review a submittal within the estimated review timeframe shall not be basis for

the Contractor to request or receive additional Contract Price or Contract Time.

G. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. Highlight and/or clearly designate specific product details and information so as to confirm product meets or exceeds Specifications.

H. Provide space for Contractor and Engineer review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements. Clearly transmit Engineer review comments to suppliers and subcontractors as required to minimize product delivery errors and miscommunications.

K. Submittals not requested will not be recognized or processed.

L. Engineer will review submittals in order received unless Contractor requests, in writing, a revised order of review. A revision in order may add to the length of review time required for previously submitted submittals.

M. Submittal of more than three major submittals per week may add to the required length of review time. Engineer shall notify Contractor of submittal review scheduling conflicts.

1.03 SUBMITTAL SCHEDULES

A. Contractor shall submit a schedule of submittal dates for shop drawings, product data, and samples.

B. The submittal schedule shall identify specification sections and anticipated submittal dates. Indicate any critical submittals and dates for Engineer’s review.

C. Provide decision dates for selection of finishes and samples.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date of Owner-Contractor Agreement. For initial schedule requirements see 01 31 13 - Project Coordination.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version. Application for Payment will not be processed until updated construction schedule has been submitted.

D. Prepare schedules as a horizontal bar chart with separate bar for each major portion of Work or operation, identifying first workday of each week as well as the proposed start and completion dates of each major portion of Work.

E. Sheet Size: Minimum 11x17 inches. Larger sizes than 11x17 inches shall be in multiples of 8½x11 inches.

F. Content

1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction. Indicate the early and late start, early and late finish, float dates, and duration.
2. Identify each item by Specification section number.
3. Identify Work of separate stages and other logically grouped activities.
4. Provide sub-schedules to define critical portions of the entire schedule.
5. Include conferences and meetings in schedule.
6. Indicate estimated percentage of completion for each item of Work at each submission.
7. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Engineer. Allow sufficient time for review by Engineer. Indicate decision dates for selection of finishes.
8. Coordinate content with schedule of values.

G. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule.

H. Distribution

1. Distribute copies of reviewed schedules to Project Site file, Subcontractors, suppliers, and other concerned parties.
2. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

1.05 PROPOSED PRODUCTS LIST

A. Within fifteen (15) days after date of Owner-Contractor Agreement, submit list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 TABULATION OF SUBCONTRACTORS

A. Contractor shall submit a complete list of subcontractors who will provide work on the project.

B. The submitted list shall include the following information for each subcontractor:

1. Name
2. Address
3. Type of work to be provided
4. Applicable specifications sections
5. Contact person

C. Contractor’s use of specific subcontractors shall be subject to the requirements included in the specifications.

1.07 TABULATION OF SUPPLIERS

A. Contractor shall submit a list of suppliers who will provide materials, equipment, or components which are integral to the Work.

B. The submitted list shall include the following information for each subcontractor:

1. Name
2. Address
3. Type of work to be provided
4. Applicable specifications sections
5. Contact person

C. Contractor’s use of specific suppliers for providing equipment, materials, or components shall be subject to the requirements of the specifications.

1.08 REQUESTS FOR INTERPRETATION

A. Contractor shall submit in writing all requests for interpretation or for information regarding the Contract Documents on the form provided by the Engineer.

B. Engineer does not guarantee that a response can be provided in the amount of time requested, but Engineer shall respond in writing to Contractor’s request within a reasonable amount of time given the extent of the request for interpretation of information required.

1.09 PRODUCT DATA

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

B. After review, provide copies and distribute in accordance with Submittal Procedures article above and for record document purposes described in Section 01 77 00 - Closeout Procedures.

C. Submit the number of copies that the Contractor requires, plus five (5) copies that will be retained by the Engineer and Engineer’s Sub consultant.

D. Mark each copy to identify applicable Products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

E. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service of functional equipment and appliances.

F. Premium and High Efficiency Product Data: The District will participate in various rebate programs for premium and high-efficiency equipment and products. Provide Proof of Purchase and Compliance product data as needed to complete the various rebate forms. Rebate forms are included as attachments to Section 01 66 00 – Common Product Requirements.

1.10 SHOP DRAWINGS

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

B. After review, produce copies and distribute in accordance with Submittal Procedures article above and for record document purposes described in Section 01 77 00 - Closeout Procedures.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Submit in electronic format for Engineer's review. Upon approval, submit four (4) hard copies that will be retained by the Engineer and Engineer's Subconsultant.

E. All shop drawings shall be submitted through the Contractor in accordance with the procedures outlined in this specification. Shop drawings received from anyone other than through the Contractor will not be reviewed.

F. Shop drawings shall contain complete detail showing conformance with the Contract Documents and such other specified information as required, including but not limited to the following

1. Related work with applicable cross references
2. Physical configuration
3. Dimensional information, including any variations from actual conditions
4. List of materials
5. Structural construction and assemblies
6. Anchor bolt details showing type, size, embedment, and locations
7. Machinery and equipment details
8. Auxiliary items to machinery and equipment
9. Protective coatings and factory finishes
10. Electrical information including motor sizes, wiring and circuit diagrams, and instrumentation
11. Testing results

G. Detail all connections required to complete the work.

H. Approval of shop drawings by Engineer shall not relieve the Contractor from responsibility of deviations from drawings or specification, unless deviations or changes have been brought to Engineer's attention at time of submission, nor shall it relieve the Contractor from responsibility for errors or omissions in shop drawings.

1.11 SAMPLES

A. Submitted to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

B. After review, produce duplicates and distribute in accordance with Submittal Procedures article above and for record document purposes described in Section 01 77 00 - Closeout Procedures.

C. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit the number of samples specified in individual Specification sections; one (1) of which will be retained by Engineer.

F. Reviewed samples that may be used in the Work are indicated in individual Specification sections.

G. Samples will not be used for testing purposes unless specifically stated in the Specification section.

1.12 TEST REPORTS

A. Submit for the Engineer's knowledge as Contract Administrator or for the Owner.

B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

C. Retain one (1) copy of all test reports and results on-site in a location accessible to Engineer.

1.13 MANUFACTURER’S CERTIFICATES

A. When specified in individual Specification sections, submit certification by the manufacturer, installation/application Subcontractor, or the Contractor to Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.14 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01 45 00 - Quality Control, Manufacturers' Field Services article.

1.15 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Engineer's benefit as Contract Administrator or for the Owner.

B. Submit report in duplicate within 15 days of observation to Engineer for information.

C. Submit the manufacturer’s field reports for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.16 INSTALLATION PLAN AND GRADE CONTROL

A. Submit description of proposed construction plan, plan to establish and maintain vertical and horizontal alignment, plan to maintain borehole stability, and drilling fluid and mud recovery process, as applicable to boring method.

B. Submit description of proposed construction plan, plan to establish and maintain vertical and horizontal alignment as applicable to open-cut methods.

C. See Sections 01 45 00 - Quality Control, 31 23 16 - Excavation, 33 05 07 - Trenchless Installation of Utility Pipe, and 33 10 00 - Water Utilities for required accuracy.

1.17 ERECTION DRAWINGS

A. Submit reports for the Engineer's benefit as Contract Administrator or for the Owner.

B. Submit report in duplicate within 30 days of observation to Engineer for information.

C. Submit the manufacturer’s field reports for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.18 EXCESSIVE SHOP DRAWING REVIEWS

A. The maximum number of submittal reviews for any one product or specification section shall be two (2).

B. Compensation for third or subsequent reviews will be required as outlined below:

1. Owner will compensate Engineer for “additional services”.
2. Owner will deduct amount of such compensation from payment to Contractor.
3. Engineer’s compensation shall be at Engineer’s standard hourly rates, plus reimbursable expenses at cost.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 33 00

SECTION 01 45 00
QUALITY CONTROL

GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance - Control of Installation.
   a. Tolerances.
   b. References and Standards.
   c. Testing Responsibilities.
   d. Inspection and Testing Services.
   e. Mill Tests.
   f. Factory Tests.
   g. Manufacturer’s Instructions.
   h. Manufacturer’s Certificates.
   i. Manufacturers' Field Services.
   j. Qualification Tests.
   k. Laboratory Tests.
   l. Product Field Tests.
   m. Material Field Tests.
   n. Coating Field Tests.
   o. Mock-up.

B. Related Sections include:

1. Division 31 – Earthwork.

C. QUALITY ASSURANCE - CONTROL OF INSTALLATION

1. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
2. Comply with manufacturer’s instructions, including each step in sequence.
3. Should manufacturer’s instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
4. Constructed to lines, grade, and dimensions as detailed on construction Drawings and within tolerances specified later in this section. Install all pipeline in strict accordance with manufacturers recommendations and deflection limits.
5. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
6. Perform Work by persons qualified to produce required and specified quality.
7. Verify that field measurements are as indicated on Contract Drawings, shop drawings, or as instructed by the manufacturer.
8. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

9. Completed Work shall be plumb, level, true to line or plane, and free from damage.

D. TOLERANCES

1. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.
    a. Grade Control
        1) Submit for Engineer's approval prior to construction, information on Contractor proposed grade control method and equipment including, but not limited to, equipment operation, accuracy, and capabilities to record and verify Grade Control.
        2) Pipeline installation shall be installed with a maximum horizontal tolerance of +/- 5.00’ for open-cut, trenched, plowed and bored pipeline.
2. Comply with manufacturers' recommendations and tolerances, including deflection limits. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
3. Adjust Products to appropriate dimensions; position before securing Products in place.

E. REFERENCES AND STANDARDS

1. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
2. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.
3. Obtain copies of standards where required by product specification sections.
4. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

F. TESTING RESPONSIBILITIES

1. Contractor’s Responsibility:
    a. Contractor shall be responsible for all quality control testing or inspections including mill tests, factory tests, qualification tests, laboratory tests, and field tests other than those required and specified in Parts 1.15 below.
    b. Quality control required by codes or ordinances, or by the plan approval authority, unless otherwise provided in the Contract Documents.
    c. Contractor’s convenience testing.
    d. Coordinate with each independent agency to accommodate required services with minimum delay in progress of work, and to avoid moving or replacing work. Schedule times for quality control services.

e. Cooperate with independent agencies performing required quality control services. Notify testing agency sufficiently in advance of operations to permit assignment of personnel. Provide auxiliary services as required, including, but not limited to the following:
    1) Providing access to work
    2) Taking samples or assistance with taking samples
    3) Delivery of samples to testing laboratories
    4) Security and protection of samples and test equipment at Site

2. Owner's Responsibility:
    a. Owner responsible quality control shall be specifically indicated. If quality control measure is not indicated as Owner responsibility it is the Contractor's responsibility.
3. Retesting Responsibility:
    a. Where results of quality control prove unsatisfactory and do not indicate compliance with Contract Documents all costs associated with retesting is the Contractor's responsibility.
    b. The costs for retesting of Owner responsible quality control shall be deducted from the Contract amount by supplemental agreement.

G. INSPECTION AND TESTING SERVICES

1. Contractor will employ services of an independent firm to perform inspection and testing. Contractor shall pay for all services required.
2. The independent firm will perform tests and other services specified in individual specification sections and as required by the Engineer.
3. Testing and source quality control may occur on or off the Site. Perform off-Site testing as required by the Engineer or the Owner.
4. Reports will be submitted by the independent firm to the Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
5. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
    a. Notify Engineer and independent firm 48 hours prior to expected time for operations requiring services.
    b. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
6. Testing does not relieve Contractor from performing Work according to Contract requirements.
7. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for re-testing will be paid by the Contractor.
8. Contractor shall select independent testing agency qualified in accordance with referenced ASTM standards and that is acceptable to the Engineer, if required for certain types of testing.
9. Comply with pertinent codes, regulations, and industry standards except when more stringent standards or tolerances are specified.

H. FACTORY TESTS

1. Factory tests of process, mechanical, and electrical equipment relative to performance, capacity, rating, efficiency, or other such requirements shall be conducted in the factory or shop for each item supplied when this type of test is specified.
2. Factory testing shall be performed in accordance with applicable standards and test codes.
3. Where factory tests are required or specified, reports of the test results shall be submitted to Engineer for approval prior to shipment. Contractor shall submit the number of test reports for approval required by the Contractor plus four (4) copies to be retained by the Engineer.
4. Factory observation of fabrication procedures, materials used, and testing methods may be performed by a representative of the Owner or Engineer. Owner shall pay for factory observation.

I. MANUFACTURERS' INSTRUCTIONS

1. Comply with manufacturer's instructions in full detail for storage, installation, assembly, installation, start-up, and adjustment. Contractor shall follow appropriate sequencing as recommended by manufacturer.
2. Should manufacturer's instructions conflict with Contract Documents, Contractor shall request clarification from Engineer prior to proceeding.
3. If required by individual product or equipment specification sections, Contractor shall submit manufacturer's printed instructions prior to assembly and installation.

J. MANUFACTURERS' CERTIFICATES

1. Submit manufacturer's certificate indicating that equipment or products meet or exceed specified requirements where required in the individual specification sections.
2. Certificates shall be submitted prior to shipment of equipment or products.

K. MANUFACTURERS' FIELD SERVICES

1. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and other services as applicable, and to initiate instructions when necessary.
2. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer subject to approval of Engineer.
3. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
4. Refer to Section 01 33 00 - Submittal Procedures.

L. QUALIFICATION TESTS

1. Should a product, material, or method for assembly of unknown or questionable quality to the Engineer be proposed by the Contractor, additional tests may be required by the Engineer.

2. Additional testing as required by the Engineer shall be used as a basis to establish acceptance or rejection.

M. LABORATORY TESTS

1. Laboratory tests shall be conducted and test reports shall be submitted where this type of test is specified. All laboratory tests shall be made by an independent laboratory approved by the ENGINEER. These tests shall be performed in accordance with applicable ASTM standards.
2. Laboratory tests may be witnessed by representatives of the Owner or Engineer.
3. Submit two (2) copies of all laboratory tests to the Engineer for record.

N. PRODUCT FIELD TESTS

1. Product field tests shall be set up and completed by the Contractor. Contractor shall provide all tools, equipment, instruments, personnel, and other facilities required for the completion of each test.
2. Product field tests of process equipment, mechanical systems, electrical systems, piping systems, and similar facilities shall be conducted where this type of test is specified.
3. Product field tests include the determination of performance, capacity, efficiency, function, tightness, leakage, and other special requirements. Product field tests shall be performed in accordance with applicable standards and test codes.
4. Product field tests may be witnessed by representatives of Owner and Engineer.

O. MATERIALS FIELD TESTS

1. Routine tests of materials incorporated into the Project will be performed by an independent testing laboratory arranged and paid for by the Contractor and acceptable to the Engineer.
2. Results of materials field testing shall be reported to the Engineer and Contractor.
3. Material field tests may be witnessed by representatives of the Owner, Engineer, and Engineer’s subconsultant and such witnessing shall be paid for by the Owner.
4. Contractor shall provide at least two different certified gradation tests from each source of materials provided for the project site at one (1) sample from each 1,500 tons of finished product used for pipeline bedding or once per individual open road cutting incident. Certified gradation tests shall be done in accordance with ASTM C136 and be performed by the independent testing laboratory hired by the Contractor.
5. Contractor shall provide at least two (2) different certified moisture-density relationship (compaction curve) tests from each source of materials provided to the project site. Certified moisture-density relationship tests shall be done in accordance with ASTM ASTM D698 and be performed by the independent testing laboratory hired by the Contractor.
6. The compaction inspections and testing shall be conducted by the independent testing laboratory hired by the Contractor and accepted by the Engineer with results being reported to the Contractor and Engineer. See Section 31 23 23 - Fill and Backfill for compaction schedule and

requirements.

P. MOCK-UP

1. Tests will be performed under provisions identified in this Section and identified in the respective product specification Sections.
2. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
3. Accepted mock-ups shall be a comparison standard for the remaining work.
4. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION 01 45 00

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary Lighting for Construction Purposes.
2. Temporary Heating.
3. Temporary Ventilation.
4. Temporary Piping and Plumbing.
5. Telephone/Email Service.
6. Temporary Water Service.
7. Temporary Sanitary Facilities.
8. First Aid Facilities.
9. Fencing.
10. Barriers.
11. Water Control.
12. Enclosures.
13. Temporary Controls.
14. Protection of Installed Work.
15. Temporary Construction Protection.
16. Security.
17. Parking.
18. Vehicle Access.
19. Progress Cleaning and Waste Removal.
20. Field Offices and Sheds.
21. Removal of Utilities, Facilities, and Controls.
22. Project Identification.

B. Related Sections include:

1.02 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. By Contractor

1. Contractor shall provide and pay for fuel-powered light plants or other light generating equipment for construction operations as required at all staging, assembly, and construction areas.
2. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
3. Maintain lighting and provide routine repairs.
4. Permanent building lighting may be utilized during construction. Replace lamps at final completion for all permanent fixtures.

1.03 TEMPORARY HEATING

A. By Contractor

1. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

2. If required, provide separate metering or reimburse Owner for cost of energy used.
3. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
4. Maintain minimum ambient temperature of 50 degrees F in areas, unless indicated otherwise in product sections.
5. Exercise measures to minimize construction heating.

1.04 TEMPORARY PIPING AND PUMPING

A. Contractor shall provide and maintain temporary pumps, piping, automatic controls, and related appurtenances to allow bypassing and continuous operation of facilities during construction where required.

B. Contractor shall submit to Engineer for approval a temporary pumping and piping plan for all bypassing activities required. Plan shall include methods, pump information, piping layouts, inlet and discharge locations, control system, and duration of bypassing operation.

C. All costs including power, installation, operation, maintenance, and removal shall be the Contractor's responsibility.

D. All bypassing systems shall be properly sized for the application, with redundancy, to assure that there are no sewage spills or backups. Contractor shall provide means for preventing backups, spills, and surcharges during connection, disconnection, and operation of temporary bypassing systems. Contractor shall be responsible for all damages caused directly or indirectly by sewage backups, spills or surcharging related to inadequacy or failure of bypassing operations.

E. Bypassing operations should be scheduled and limited to the minimum time required to complete required construction activities.

F. In the event of an emergency, Contractor shall have on standby, a means to provide a temporary bypass to collect and dispose of sewage.

G. Standby power shall be provided for all bypass pumping systems.

1.05 TELEPHONE/EMAIL SERVICE

A. Provide, maintain, and pay for telephone and E-mail service to project superintendent from time of project mobilization to final completion.

1.06 TEMPORARY WATER SERVICE

A. General Contractor to connect to existing water source for construction operations at time of project mobilization. Contractor shall protect any temporary water connection from freezing and theft and restore to original or better condition upon disconnection.

B. Contractor shall verify location of temporary water supply on or near site and shall provide piping, hoses, meter, and fittings required to distribute it as required by the Work. Contractor shall supply approved backflow prevention and metering equipment.

C. Contractor shall be charged by Owner for water use throughout the construction period for filling, disinfecting, testing, flushing, and pigging of pipelines. Contractor will pay for flushing and disinfection water obtained from Water District at Owner's cost of $4.00 per 1,000 gallons. Volume of water will be considered as three (3) times the volume of the total pipeline length for initial filling, disinfecting, testing, and flushing. Should additional water be required for these purposes to due failure of pipeline preparation, bacterial or pressure testing and inspection as described in Section 33 01 10 Disinfection of Water Utility Distribution System, additional volume of water used by Contractor shall be determined by use of an Owner approved water meter.

D. Contractor shall be charged by Owner for water use throughout the construction period for any and all construction purposes of the project, including but not limited to water required for directional drilling, cleaning of equipment, hydroseeding, etc. Contractor will pay for temporary water obtained from Water District at Owner's cost of $4.00 per 1,000 gallons. Volume of water will be determined by use of an Owner approved water meter.

E. Contractor shall not damage plumbing at source of temporary water.

F. Where water source is not available at or near site, Contractor shall make arrangements with Owner for source of water at appropriate hydrant locations. Contractor shall provide tanker truck, and metering equipment necessary to measure water from hydrant locations.

1.07 TEMPORARY SANITARY FACILITIES

A. Contractor shall provide and maintain required facilities and enclosures. Provide from time of project mobilization to final completion.

1.08 FIRST AID FACILITIES

A. First aid facilities shall be provided and maintained by the CONTRACTOR in accordance with all federal, state, and local laws and regulations.

1.09 FENCING

A. By Contractor:

1. Provide fencing around open excavation areas of Work as required, assuring safe working conditions.
2. Provide adequate vertical posts, bracing, and ties to maintain temporary fencing alignment and to keep fence in position during all site weather conditions.
3. Owner and Engineer shall be provided with any keys necessary to access the project site.

1.10 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide protection for plants designated to remain. Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.11 WATER CONTROL

A. By Contractor:

1. Grade site to drain.
2. Maintain excavations free of water.
3. Provide, operate, and maintain pumping equipment.
4. Protect site from puddling or running water.
5. Provide water barriers as required to protect site from soil erosion.

1.12 ENCLOSURES

A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with locks; Owner shall have access to site at all times.

B. Temperatures inside the enclosures and/or enclosed parts of structures shall be not less than 60 degrees F for 48 hours prior to and during time when concrete work, cement finishing, or masonry work are being completed or curing and not less than 50 degrees F when other trades are working.

1.13 TEMPORARY CONTROLS

A. NDPDES Permit Requirements For Small Construction Activity

1. Classification: This will include all projects that disturb between 1 and 5 acres of land. Activities that disturb less than one acre do not require permitting, unless they are part of a larger common plan of development. However, erosion and sediment control provisions should still be incorporated into the project, regardless of size. For very small projects, this may mean protecting one or two inlets and seeding or sodding a portion of boulevard.
2. All contractors performing work on small construction sites (i.e. – less than five acres) must submit a single one time application (Notice of Intent, or NOI) to the North Dakota Department of Environmental Quality (NDDEQ) that will cover all of their work on small construction sites.
3. Operators of small construction sites must maintain an Annual Record of all of their small construction sites. This Annual Location Record must be submitted to the NDDEQ by January 31 of each year, documenting all of their sites during the past construction season. This record must be kept

current, so that it can be viewed at any time and their sites under construction must be recorded.

4. The Contractor's Annual Location Record must indicate the date when the site has been either stabilized or operational control has been transferred to another owner or operator.
5. Storm Water Pollution Prevention Plan (SWPPP): The contractor will prepare the SWPPP for this project. Erosion and sediment controls included in the plans and specifications will be incorporated into the SWPPP.
6. Guidance forms are available from the NDDEQ. The completed SWPPP shall be provided within three calendar days following the Notice of Award. Failure to do so may result in a delay issuing the Notice to Proceed without a corresponding extension of the contract completion date.
7. The contractor shall include the following information in the completed SWPPP:
    a. Any proposed modifications or alterations required to facilitate the contractor's means or methods of operation. The engineer shall have the final say as to whether or not the proposed changes are acceptable.
    b. When alternatives for various storm water protection measures are provided for, the contractor shall indicate the alternatives intended for use on the project.
    c. Spill prevention and response procedures.
    d. Procedures for site inspection and maintenance.
    e. Description of sediment tracking reduction and sediment recovery methods.
    f. Significant materials inventory.
    g. Locations and procedures for storage of materials, waste handling, temporary sanitary facilities, concrete washout, and debris disposal unless such information is already included in the plans and specifications.
    h. Signature of all subcontractors and suppliers performing work or delivering materials to the project site.
8. Responsibility for Compliance: The contractor shall be responsible for all inspections, documentation, record-keeping, maintenance, remedial actions and repairs of storm water protection measures required to maintain compliance with the NDPDES General permit for storm water discharge associated with construction activity by the NDDEQ. The Contractor shall be solely responsible and hold the Owner and Engineer harmless for any fines or enforcement action levied by other agencies having jurisdiction, which result from the Contractor's actions, inactions or negligence regarding compliance with the permit or erosion control provisions of the contract documents.
9. In addition, it shall be the Contractor's responsibility to ensure that all subcontractors and suppliers are aware of and comply with the terms and conditions of the permit.
10. Documentation: The Contractor shall have a copy of the SWPPP available on-site for viewing at all times during construction operations. Inspection and maintenance forms shall be kept current and submitted to

the engineer every two weeks. Failure to provide inspection forms shall result in delaying the processing of pay estimates.

B. NDPDES Permit Requirements For Large Construction Activity

1. Classification – If the Engineer has estimated the project will result in or is part of a larger common plan of development that will result in a land disturbance of 5 or more acres, the NDPDES permit requirements for Large Construction Activity shall apply.
2. Notice of Intent: The Contractor shall sign the Notice of Intent for permit coverage. By signing the proposal and completing the permit, the contractor is to ensure compliance with the terms and conditions of the NDPDES general permit to discharge storm water associated with construction activity.
3. SWPPP: The contractor will prepare the SWPPP for this project. Erosion and sediment controls included in the plans and specifications will be incorporated into the SWPPP.
4. Guidance forms available from the NDDEQ. The completed SWPPP shall be provided within three calendar days following the Notice of Award. Failure to do so may result in a delay issuing the Notice to Proceed without a corresponding extension of the contract completion date.
5. The contractor shall include the following information in the completed SWPPP:
    a. Any proposed modifications or alterations required to facilitate the contractor's means or methods of operation. The engineer shall have the final say as to whether or not the proposed changes are acceptable.
    b. When alternatives for various storm water protection measures are provided for, the contractor shall indicate the alternatives intended for use on the project.
    c. Spill prevention and response procedures.
    d. Procedures for site inspection and maintenance.
    e. Description of sediment tracking reduction and sediment recovery methods.
    f. Significant materials inventory.
    g. Locations and procedures for storage of materials, waste handling, temporary sanitary facilities, concrete washout, and debris disposal unless such information is already included in the plans and specifications.
    h. Signature of all subcontractors and suppliers performing work or delivering materials to the project site.
6. Responsibility for Compliance: The contractor shall be responsible for all inspections, documentation, record-keeping, maintenance, remedial actions and repairs of storm water protection measures required to maintain compliance with the NDPDES General permit for storm water discharge associated with construction activity by the NDDEQ. The contractor shall be solely responsible and hold the Owner and Engineer harmless for any fines or enforcement action levied by other agencies having jurisdiction, which result from the contractor's actions, inactions or negligence regarding compliance with the permit or erosion control

provisions of the contract documents.

7. In addition, it shall be the contractor’s responsibility to ensure that all subcontractors and suppliers are aware of and comply with the terms and conditions of the permit.
8. Documentation: The contractor shall have a copy of the SWPPP available on-site for viewing at all times during construction operations. Inspection and maintenance forms shall be kept current and submitted to the engineer every two weeks. Failure to provide inspection forms shall result in delaying the processing of pay estimates.
9. Termination of Permit Responsibilities: The contractor shall be relieved of his permit responsibilities when the project is substantially complete, all required storm water protection measures are in place, and permit responsibilities have been transferred to another contractor or owner, or the site has undergone final stabilization.

1.14 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

D. Prohibit traffic from landscaped areas.

E. Prohibit traffic outside of easement areas and construction limits.

1.15 TEMPORARY CONSTRUCTION PROTECTION

A. Shoring and Bracing:

1. Contractor shall provide and maintain temporary supports, shoring, and bracing as required for protection of work.
2. Contractor shall assure the adequacy of all temporary shoring and bracing.
3. Repair or replace damaged work occasioned by inadequate temporary supports, shoring, or bracing.
4. Leave temporary supports, shoring, and bracing in place until permanent construction is complete to point where installed work is properly supported.

1.16 SECURITY

A. Provide security and facilities to protect Work, and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program, if any.

C. Deliveries, Contractor shall inform

1. Engineer and Owner of all equipment deliveries at least 24 hours in advance of equipment/material arrivals scheduled for delivery to Owner

occupied facilities.

D. Contractor to discuss security with his employees and sub-contractors and advise them to immediately report anything suspicious that could be a security issue.

1.17 PARKING

A. Contractor and personnel shall park all personal vehicles in an area acceptable to Owner and applicable property owners within all construction areas.

B. Do not block or hinder access to local property, driveways, field entrances, or walkways.

1.18 VEHICLE ACCESS

A. By Contractor.

1. Maintain access roads leading into Site.
2. Provide means of removing mud from vehicle wheels before entering streets and roads.
3. Construct and maintain temporary roads accessing public roads to serve construction areas.
4. Provide aggregate materials as an incidental to the Contract is access roads are not suitable for truck and equipment traffic or to accommodate local rainfall events.
5. When finished using access road(s) remove temporary access roads and return surface to pre-existing or better condition, as an incidental to the project.

B. Traffic Control

1. Contractor shall provide and maintain signs, warning lights, and barricades to adequately protect warn and protect the public from hazardous protrusions, materials, excavations, and equipment resulting directly or indirectly from construction activities.
2. All traffic control devices including signs, warning lights, and barricades shall conform to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD).
3. Traffic control setup and layout shall conform to requirements of the MUTCD Traffic Control Zone Layouts (field manual) and shall be the sole responsibility of the Contractor.
4. Contractor shall give Owner and Engineer at 48 hours' notice prior to a partial blockage or closure of any street or public right of way. When working in the right of way of county roads, Contractor shall be responsible for acquiring the necessary permits for working in a right-of-way.
5. Traffic control devices shall be inspected daily. Warning lights should be checked for proper operation and cleaned as required. All broken or ineffective traffic control devices shall be replaced immediately.
6. Contractor shall designate an individual and one alternate to have responsible charge of proper installation and maintenance of the traffic control devices. These individuals shall be available on a 24-hour on call

basis.

1.19 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

D. Contractor shall maintain site clean and free of obstructions that may cause injuries or otherwise prevent staff (Owner, Engineer, Contractors, etc.) from performing their job effectively.

1.20 FIELD OFFICES AND SHEDS

A. Construction Field Office (trailer or shed): At Contractor's option.

B. Field office shall be weatherproof and insulated with finished interior walls, ceilings, and floors.

C. Contractor shall have on hand three (3) adjustable band protective helmets, earplugs, and protective glasses for visitors.

D. Locate Field Offices and construction trailer or shed a minimum distance of 30 feet from existing and new structures. Owner's approval of location is required.

1.21 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, prior to Final Application for Payment inspection.

B. Remove underground installations to a minimum depth of 3 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.22 PROJECT IDENTIFICATION

A. Provide project sign as detailed in Supplemental General Conditions, if any. Erect on-site at location established by Engineer and Owner.

B. No other signs are allowed except those required by law.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 50 00

SECTION 01 61 00
COMMON PRODUCT REQUIREMENTS

GENERAL

1.01 SUMMARY

A. This Section includes:

1. Products.
2. Transportation and Handling.
3. Storage and Protection.
4. Product Options.
5. Substitutions.

B. Related Sections include, but are not limited to:

1. Section 01 25 00 - Substitution Procedures.
2. Section 01 45 00 - Quality Control.
3. Division 31 – Earthwork.

1.02 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components designated for re-use.

B. **All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.**

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

D. Provide interchangeable components of the same manufacturer for components being replaced.

1.03 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.04 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

J. Contractor shall be responsible to arrange for, receive, inspect, and unload all shipments of materials or equipment. Contractor shall provide haul route information to shipping companies.

1.05 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with an option for an “Or Equal” or “Approved Equivalent” or “Prior Approved Equivalent” Manufacturer: Submit a request for the “or equal/approved equivalent” in accordance with the following substitutions article. Requests and Engineer’s acceptance of “Or Equal” or “Approved Equal” or “Prior Approved Equivalent” Manufacturers is allowed during bidding only.

1.06 SUBSTITUTIONS

A. See Specification Section 01 25 00 - Substitution Procedures 01 25 00 Substitution Procedures.

PRODUCTS

2.01 UNIFORMITY

A. For any type of similar equipment, i.e., valves, couplings, saddles, curb stops, motors, drive units, etc., provide equipment of the same manufacturer throughout the Project.

B. Inform all subcontractors and suppliers of the selected manufacturers to ensure equipment uniformity.

2.02 TOOLS

A. For any equipment or equipment components requiring special tools, the Contractor shall supply the Owner with such tools to allow for the maintenance and removal/replacement of equipment components.

2.03 CONSUMABLES

A. Provide Owner with all consumable items that are required during start-up and initial operation (90 days minimum) of all Project components.

EXECUTION

3.01 INSTALLATION

A. Install all equipment in full compliance with the manufacturer's recommendations.

B. Obtain services of qualified and approved factory representatives to install, check, and approve the installation of all equipment.

C. Service representative:

1. Present for the start-up and initial operation of all equipment.
2. Certify in writing that:
   a. Equipment is properly installed and ready for operation.
   b. Equipment properly aligned.
   c. Direction of rotation checked.
   d. Lubrication is proper.
   e. Unit is free from undue stress from connecting pipe or anchorage.
   f. Unit has operated at full load conditions.
   g. Unit has operated in full compliance with the project specifications and the manufacturer's recommendations.

END OF SECTION 01 61 00

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SECTION 01 73 29
CUTTING AND PATCHING

GENERAL

1.01 SUMMARY

A. This Section includes:

1. Requirements and limitations for cutting and patching of Work.

B. Related Sections include:

1. Section 01 25 00 - Substitution Procedures.
2. Individual Product Specification Sections:
   a. Cutting and patching incidental to Work of this Section.
   b. Advance notification to other Sections of openings required in Work of those Sections.

1.02 SUBMITTALS

A. Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate contractor(s).

B. Include in request:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and Products to be used.
5. Alternatives to cutting and patching.
6. Effect on work of Owner or separate contractor(s).
7. Written permission of affected separate contractor(s).
8. Date and time Work will be executed.

PRODUCTS

2.01 MATERIALS

A. Those required for original installation.

EXECUTION

3.01 EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, assess conditions affecting performance of Work.

C. Understand and become familiar with required coating systems, application requirements, and spatial concerns, issues, and dimensions required to perform the Work.

D. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas that may be exposed by uncovering Work.

C. Maintain excavations free of water.

D. Verify that all materials are clean and free from defects.

3.03 CUTTING

A. Execute cutting and fitting to complete the Work.

B. Uncover work to install improperly sequenced Work.

C. Remove and replace defective or non-conforming Work.

D. Remove samples of installed Work for testing, when requested.

E. Employ original installer of new Work to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces. Employ experienced personnel or original supplier for applying specialized coating systems.

F. Cut rigid materials, masonry, prestressed concrete, and concrete using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

3.04 PATCHING

A. Execute patching to complement adjacent Work.

B. Fit Products together to integrate with other Work.

C. Execute Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer of new Work to perform patching for weather and moisture resistant elements, and sight-exposed surfaces.

E. Restore Work with new Products in accordance with requirements of Contract Documents.

F. Fit Work airtight and water tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Identify any hazardous substance or condition exposed during the Work to the Engineer for decision or remedy.

3.05 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in Product sections; match existing Products and Work for patching and extending Work.

B. Employ skilled and experienced installer to perform alteration Work.

C. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

D. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.

E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with a neat transition to adjacent finishes.

F. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Engineer for review.

H. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition; to Engineer for review request instructions from Engineer.

I. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

J. Finish surfaces as specified in individual Product Sections.

END OF SECTION 01 73 29

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SECTION 01 75 00
STARTING AND ADJUSTING

GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance.
2. Scheduling.
3. Preparation.
4. Starting Systems.
5. Start-Up Period.
6. Adjusting.
7. Acceptance of Equipment and Systems.
8. Guarantee and/or Warranty Period.

B. Related Sections include:

1. Section 01 45 00 - Quality Control.

1.02 QUALITY ASSURANCE

A. Provide authorized and qualified manufacturer's representative to inspect, check, and approve equipment installation prior to start-up and to assist with demonstration testing.

B. Authorized representative shall supervise placing equipment into operation.

C. Prior to demonstration to Owner and Engineer, provide written confirmation that systems have been tested, adjustments have been made, and equipment is ready for start-up demonstration.

D. Provide access to equipment and systems. Operate systems at designated times and under conditions required.

E. Contractor shall submit two (2) copies of written start-up report for each system or equipment item following each start-up.

1.03 SCHEDULING

A. Contractor shall submit two (2) copies of preliminary start-up, and instruction schedule at least 15 calendar days prior to proposed dates. List times and dates for each system or equipment item. Include names of Contractors and subcontractors personnel, manufacturer, and/or authorized representative proposed to perform services. Provide documentation to verify their qualifications.

B. Contractor shall coordinate scheduling of start-up. Scheduling of start-up shall be subject to approval of Owner and Engineer.

C. Contractor shall notify Owner and Engineer of changes in scheduling at least five (5) days in advance prior to scheduled start-up of individual systems or

equipment. Scheduling changes shall be subject to approval by Owner and Engineer.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 PREPARATION

A. Confirm wiring and controls are operational.

B. Inspect equipment for cleanliness and remove or clean foreign matter.

C. Confirm that equipment is properly anchored and supported.

D. Inspect hand and automatic valves, clean bonnets and stems, tighten packing glands to ensure no leakage. Adjust valves as necessary for proper operation. Verify valve proper valve positioning for prior to start-up and testing of associated equipment.

3.02 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

3.03 ACCEPTANCE OF EQUIPMENT AND SYSTEMS

A. Upon completion of training specified in Section 01 79 00 - Demonstration and Training, receipt of the final operation and maintenance manuals per Section 01 78 23 - Operation and Maintenance Data, receipt of the required start-up and demonstration testing reports, and following successful completion of the 15 day operating period, Engineer shall promptly review submittals of the manuals and reports.

B. Contractor shall provide additional information or tests if required by the Engineer.

C. Following review of the information, Engineer shall recommend approval of the equipment and acceptance of the installation to the Owner. The Owner shall provide in writing notice of acceptance of the equipment within a reasonable time after receipt of Engineer's recommendation.

D. Equipment placed into temporary operation prior to final completion of the project shall be readjusted and/or calibrated as required prior to final completion of the project.

E. After equipment has been tested, adjusted, and accepted in writing by the Owner, but before final acceptance of the entire project, the Owner will assume operation and maintenance responsibilities for the equipment or systems, including power and fuel costs. The Owner may place portions of the facility into

operation prior to final acceptance of the entire project.

3.04 GUARANTEE AND/OR WARRANTY PERIOD

A. The guarantee or warranty period for all equipment and/or systems will start from the date of written notice of final acceptance of the equipment and/or systems by the Owner.

B. There will be no exceptions to the start of the guarantee or warranty period.

END OF SECTION 01 75 00

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SECTION 01 77 00
CLOSEOUT PROCEDURES

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Closeout Procedures.
2. Substantial Completion.
3. Interim Substantial Completion Milestone Dates.
4. Final Completion.
5. Final Cleaning.
6. Project Record Documents.
7. Spare parts and Maintenance Products.
8. Warranties and Bonds.
9. Maintenance Service.
10. Final Adjustment of Accounts.

B. Related Sections include:

1. Section 01 50 00 - Temporary Facilities and Controls.

1.02 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of the Project.

1.03 SUBSTANTIAL COMPLETION

A. Prior to substantial completion Contractor shall review Contract Documents for items which are not complete or need to yet be completed including submittal of all manuals, and testing reports. Contractor shall make a list of incomplete work, a value of the incomplete work, and reasons why work is incomplete. Contractor shall complete all items required to be completed as part of substantial completion.

B. Substantial Completion is defined as the time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of the 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 of delivering potable water to Owner’s customers. In addition, to achieve Substantial Completion of the Work for distribution and

transmission pipelines and all associated appurtenances required for a complete and operable installation located in agricultural fields, completed Work shall include top soil replacement, spreading, and cultivation of disturbed field areas to allow full and unhindered use by property owners as agricultural land for seed bed purposes in the spring of the immediately following spring planting season in each respective Base Bid or Alternate. The terms “substantially complete” and “substantially completed” as applied to all or a part of the Work refer to Substantial Completion thereof.

C. Contractor shall provide a written notice to Engineer that the work, or specific portions of the work, is substantially complete and ready for review. If there are any items remaining to be corrected or completed Contractor shall submit a list of these items along with the notice of substantial completion. Along with the list of items the Contractor should provide a written explanation of why these items are not considered necessary for substantial completion.

D. Upon receipt of Contractor's notice of substantial completion, Engineer will proceed with inspection for substantial completion.

E. Following the substantial completion inspection by the Engineer and Engineer's subconsultants, Engineer will either prepare certificate of substantial completion, or notify the Contractor in writing that substantial completion has not been met listing the various reasons.

F. Contractor shall promptly complete the items required to meet substantial completion and submit a second notice of substantial completion to the Engineer.

G. Engineer will review the work a second time do determine the status of substantial completion.

H. When Engineer considers the project to be substantially complete, Engineer will prepare the preliminary certificate of substantial completion along with a substantial completion punch list of items to be completed prior to final payment. Engineer will deliver preliminary certificate and punch list to Owner and consider any objections by the Owner as provided in the Conditions of the Contract.

I. Upon agreement by Owner and Engineer of substantial completion and punch list items, Engineer will execute and deliver to the Contractor and Owner a final certificate of substantial completion along with substantial completion punch list of items to be completed prior to final payment.

J. A maximum of two (2) reviews of substantially complete work will be completed by Engineer and Engineer's subconsultants for any one portion of work under the Contract. Should a third or subsequent reviews be necessary the following requirements will be met:

1. Owner will compensate Engineer for additional reviews.
2. Owner will deduct the amount of compensation paid to the Engineer for additional reviews from the payment to the Contractor.

3. Compensation shall be at Engineer's standard hourly rates plus actual cost of reimbursables.

1.04 INTERIM SUBSTANTIAL COMPLETION MILESTONE DATES ARE INCLUDED WITHIN THIS PROJECT WITH REGARDS TO INSTALLATION OF USERS, BORES, AND PIPELINES. THE CONTRACTOR SHALL COMPLETE THE FOLLOWING MILESTONES:

A. Base Bid 1 & Alternate 1

1. Interim Substantial Completion
   a. Zone A - November 15, 2025

1.05 FINAL COMPLETION

A. Following substantial completion Contractor shall complete remaining work and items to be corrected as part of substantial completion punch list as well as final cleaning and transferring site to Owner.

B. When Contractor considers that all work is complete, Contractor shall provide written notice of final completion to Engineer.

C. Following receipt of final completion certification, Engineer and Engineer's subconsultants shall review the work to verity that the requirements for final completion have been met.

D. Upon review of work for final completion Engineer will either request the Contractor to make closeout submittals or will notify Contractor that the work is not complete with a list of incomplete or defective work. Contractor shall promptly take steps to correct all listed deficiencies and incomplete work before sending a second written notice of final completion certification to Engineer.

E. If final completion was not met following first review, Engineer will review work a second time to determine if the requirements for final completion have been met.

F. A maximum of two (2) reviews of final complete work will be completed by Engineer and Engineer's subconsultants for any one portion of work under the Contract. Should a third or subsequent reviews be necessary the following requirements will be met:

1. Owner will compensate Engineer for additional reviews.
2. Owner will deduct the amount of compensation paid to the Engineer for additional reviews from the payment to the Contractor.
3. Compensation shall be at Engineer's standard hourly rates plus actual cost of reimbursables.

G. When Engineer considers all work to be complete in accordance with the Contract Documents, Engineer shall request the Contractor to make closeout submittals.

1.06 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

C. Replace filters of operating equipment.

D. Clean site; sweep paved areas, rake clean landscaped surfaces.

E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.07 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling current and future reference by Owner and Engineer.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit documents to Engineer with claim for final Application for Payment.

1.08 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.09 WARRANTIES AND BONDS

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in D size three ring binders with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of components during the warranty period.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

1.11 FINAL ADJUSTMENT OF ACCOUNTS

A. Contractor shall submit a final statement of accounting to Engineer. Statement shall reflect all adjustments to the contract sum and include the following:

1. Original contract sum.
2. Additions and deductions resulting from:
    a. All previous change orders
    b. Allowances
    c. Unit prices
    d. Deductions for uncorrected work
    e. Penalties and bonuses
    f. Deductions for liquidated damages
    g. Deductions for multiple reviews
    h. Other adjustments
3. Total contract sum as adjusted.
4. Previous payments.
5. Sum remaining due.

B. Engineer will prepare a final change order, reflecting approved adjustments to the contract sum which were not previously made by change orders.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 77 00

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

GENERAL

1.01 SUMMARY

A. Section includes:

1. Quality Assurance.
2. Format.
3. Contents of Each Volume.
4. Manual for Equipment and Systems.
5. Instruction of Owner's personnel.
6. Submittals.
7. Schedule of Submittals.

B. Related Sections include:

1. Section 01 45 00 - Quality Control.

1.02 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03 FORMAT

A. Prepare data in the form of an instructional manual. Arrange data in numerical format.

1. Binders:
   a. Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
   b. 2 inch maximum ring size.
   c. When multiple binders are used, correlate data into related consistent groupings.
2. Cover; Identify:
   a. Each binder with typed title OPERATION AND MAINTENANCE INSTRUCTIONS.
   b. Title of Project.
   c. Subject matter of contents.
   d. Volume number.
   e. Year of construction.
3. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

B. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

C. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages. Folded paper should be able to unfold without removal from binder.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions; arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
3. Part 3: Project documents and certificates, including the following:
    a. Shop drawings and product data.
    b. Air and water balance reports.
    c. Certificates.
    d. Photocopies of warranties.
    e. Bonds.

E. USB Flash Drive:

1. USB Flash Drives shall be provided with all documents included with an index, tabs, and labels as previously required for the binders.

1.04 CONTENTS OF EACH VOLUME

A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Engineer, Subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

F. Warranties: Prepare and submit per Section 01 77 00 - Closeout Procedures.

G. Bonds: Prepare and submit per Section 01 77 00 - Closeout Procedures.

H. Flash Drive: A flash drive shall be provided with all volume contents in electronic format or scanned to a portable document file (.pdf). The documents shall be

placed as required under the appropriate tabs and labels as previously required for the compact discs. Each file shall be adequately labeled to identify the contents without opening the document.

1.05 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed. Refer to applicable Division 26 specification Sections.

C. Include color-coded wiring diagrams as installed. Refer to applicable Division 26 specification Sections.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage, and local sources of supply.

N. Additional Requirements: As specified in individual Product specification sections.

O. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

P. Flash Drive: A flash drive shall be provided with all manuals in electronic format or scanned to a portable document file (.pdf). The documents shall be placed as required under the appropriate tabs and labels as previously required for the compact disc. Each file shall be adequately labeled to identify the contents without opening the document.

1.06 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.07 SUBMITTALS

A. Submit electronic copies of preliminary draft or proposed formats and outlines of contents before Substantial Completion. Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit electronic copies of completed volumes fifteen (15) working days prior to final inspection. One (1) copy will be returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.

D. Submit two (2) sets of revised final volumes in final form within ten (10) days after final inspection.

E. Submit a minimum of two (2) complete copies of the flash drives with final documents in electronic format within (10) days after final inspection.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 NOT USED.

END OF SECTION 01 78 23

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SECTION 01 79 00
DEMONSTRATION AND TRAINING

GENERAL

1.01 SUMMARY

A. Section includes:

B. Quality Assurance.

1. Scheduling.
2. Demonstration Testing.
3. Equipment Training.

C. Related Sections include:

1. Section 01 45 00 - Quality Control.
2. Section 01 61 00 - Common Product Requirements.

1.02 QUALITY ASSURANCE

A. Provide authorized and qualified manufacturer's representative to inspect, check, and approve equipment installation prior to start-up and to assist with demonstration testing.

B. Authorized representative shall supervise placing equipment into operation.

C. Prior to demonstration to Owner and Engineer, provide written confirmation that systems have been tested, adjustments have been made, and equipment is ready for start-up demonstration.

D. Provide access to equipment and systems. Operate systems at designated times and under conditions required.

E. Contractor shall submit two (2) copies of written demonstration testing report following completion of demonstration testing for each equipment item. Report shall describe the test, test conditions, and result.

1.03 SCHEDULING

A. Contractor shall submit two (2) copies of demonstration testing and instruction schedule at least 15 calendar days prior to proposed dates. List times and dates for each system or equipment item. Include names of Contractors and subcontractors personnel, manufacturer, and/or authorized representative proposed to perform services. Provide documentation to verify their qualifications.

B. Contractor shall coordinate scheduling of start-up, demonstration testing, and instruction of Owner's personnel by manufacturer's representatives. Scheduling of start-up, demonstration testing, and instructional activities shall be subject of approval of Owner and Engineer.

C. Contractor shall notify Owner and Engineer of changes in scheduling at least five (5) days in advance prior to demonstration testing or instructional services for an individual systems or equipment. Scheduling changes shall be subject to approval by Owner and Engineer.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 DEMONSTRATION TESTING

A. Upon completion of inspection, adjusting, and balancing per Section 01 75 00 - Starting and Adjusting; demonstrate that each separate piece of equipment of each system and related mechanical or instrumentation and control equipment operate in accordance with the requirements of the Contract Documents. Where no performance requirements are specified, demonstrate the equipment operates in accordance with the manufacturer's requirements and industry standards for the specific application.

B. Demonstration tests shall confirm smooth operation, without excessive noise or vibration; equipment is responsive to manual and automatic controls; control and protective devices are properly set; and equipment will run on controlled or intermittent basis.

C. Demonstrate all alarm and safety lockout systems for correct functioning with instrumentation and control. Each remote control point and alarm point shall be tested.

D. In the event of demonstration test failure, the equipment shall be adjusted, repaired, or replaced subject to approval of the Engineer. Following adjustment, repairs, or replacement the equipment shall be demonstration tested again. All costs for adjustment, repairs, or replacement shall be the responsibility of the Contractor.

E. All costs associated with the demonstration testing, including power and fuel costs shall be the responsibility of the Contractor.

3.02 EQUIPMENT TRAINING

A. The Contractor shall provide competent personnel who fully understand the operation of the equipment and who are authorized by the manufacturer to instruct the Owner on the operation and maintenance of each equipment item and/or system.

B. Instruction and training shall take place following initial start-up, balancing, and testing of equipment or system. The instruction and training may take place prior to demonstration testing or during the 15 day operation period, but shall take place prior to acceptance of the installation by the Owner.

C. Training shall be of the on-the-job type, and shall cover all areas of control, operation, and maintenance.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six (6) months.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. The amount of time required for instruction on each item of equipment and system is not less than that specified in individual sections.

I. Taping of Training Sessions:

1. The Owner reserves the right to use any types of audio/visual recording devices during start-up and training activities.

END OF SECTION 01 79 00

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DIVISION 03
CONCRETE

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SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

CONCRETE FORMING AND ACCESSORIES

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Form accessories.

C. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcing.

B. Section 03 30 00 - Cast-In-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

D. ACI 347R - Guide to Formwork for Concrete; 2014.

E. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures: American Concrete Institute

F. PS 1 - Structural Plywood; 2009.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.

B. Product Data: Provide data on void form materials and installation requirements.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

D. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

E. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.

F. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

B. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

2.03 REMOVABLE PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Preformed Plastic Forms: Thermoplastic form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

D. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 4 inches thick unless noted otherwise on drawings.

2.04 FORMWORK ACCESSORIES

A. Form Ties: Removable or Snap-Off type, fixed length, cone type, with waterproofing washer, 1-1/2 inch back break dimension, free of defects that could leave holes larger than 1-1/4 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

1. Composition: Colorless reactive or vegetable-oil based compound.
2. Do not use materials containing diesel oil or petroleum-based compounds.
3. VOC Content: In compliance with applicable local, State, and federal regulations.

4. Product must meet NSF requirements.
5. Products:
    a. SpecChem, LLC ; Bio Strip WB (water-based): www.specchemllc.com/sle.
    b. BASF Corporation: MasterFinish Series.
    c. R. Meadows, Inc ; Duogard Series: www.wrmeadows.com.
    d. Substitutions: See Section 01 61 00 - Common Product Requirements.

C. Filler Strips for Chamfered Corners: Rigid plastic or Wood type; 3/4-inch size; maximum possible lengths.

D. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

F. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted without specific approval from the Engineer.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. The forms shall be constructed, shored, braced, and tied to maintain their position and shape during and after placing concrete. The forms shall have adequate stiffeners, wales, and braces to prevent noticeable deflection or waviness. Forms shall be sufficiently rigid to limit deflection under the weight of wet concrete to 1/8 inch.

C. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

D. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

E. Align joints and make watertight to prevent leakage of mortar. Keep form joints to a minimum.

F. Obtain approval before framing openings in structural members that are not indicated on drawings.

G. Coordinate this section with other sections of work that require attachment of components to formwork.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes that are affected by agent.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Position recessed anchor slots for brick veneer masonry anchors and precast veneer anchors to spacing and intervals specified in other sections.

E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms unless formwork and concrete construction proceed within heated enclosure. Use compressed

air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 00 - Quality Control.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

1. Forms must be left in place for a minimum of 18 hours after concrete placement.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Concrete shall not display any evidence of damage or excessive deflection due to form removal or loss of temporary support.

D. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

E. Shoring and/or forms shall be left in place as necessary to carry any construction equipment or materials that are placed during construction.

END OF SECTION 03 10 00

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SECTION 03 20 00
CONCRETE REINFORCING

CONCRETE REINFORCING

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

C. Concrete anchors where otherwise not specified.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories.

B. Section 03 30 00 - Cast-In-Place Concrete 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

C. ACI SP-66 - ACI Detailing Manual; 2004.

D. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

F. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 2014.

G. CRSI (DA4) - Manual of Standard Practice; 2009.

H. CRSI (P1) - Placing Reinforcing Bars; 2011.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.
2. Unfinished.

B. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel or plastic components for placement within 2 inches of weathering surfaces.

C. Rebar Dowel Anchorage: Post installed epoxy and acrylic systems. Submit proposed system for each specific use.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4)- Manual of Standard Practice and ACI 318.

B. Welding of reinforcement is not permitted.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support, and secure reinforcement against displacement. Do not deviate from required position.

B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

C. Accommodate placement of formed openings.

D. Conform to applicable code, contract drawings and General Structural Notes for concrete cover over reinforcement.

E. All slab reinforcing must be on chairs. Hand lifting without supports during pour is prohibited.

F. All dowels between concrete elements must be tied in place prior to pour. Wet sticking dowels during pour is prohibited.

G. Reinforcement shall be free of foreign particles or coatings including form oils. Replace reinforcement that cannot be cleaned.

H. Upon completion of placement of reinforcing, notify Engineer and allow 24 hours for review prior to commencement of concrete placement.

END OF SECTION 03 20 00

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

CAST-IN-PLACE CONCRETE

1.01 SECTION INCLUDES

A. Concrete Slabs

B. Miscellaneous concrete elements, including equipment pads and pump bases.

C. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 03 20 00 - Concrete Reinforcing.

C. All other specification sections defining items passing through or cast into concrete.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

B. ACI 301 - Specifications for Structural Concrete

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

D. ACI 305.1 - Specification for Hot Weather Concreting.

E. ACI 306.1 - Specification for Cold Weather Concreting.

F. ACI 308.1 - Standard Specification for Curing Concrete.

G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

H. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary.

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

L. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2013.

M. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2012.

N. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.

P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2014.

Q. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

T. ASTM C494/C494M ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

U. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes; 2001 (Reapproved 2012).

V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

W. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

X. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.

Y. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.

Z. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).

AA. Portland Cement Association (PCA).

BB. PCA - Design and Control of Concrete Mixtures.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301, ACI 318, and ACI 350.

B. Follow requirements of ACI 305R when concreting during hot weather.

C. Follow requirements of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00 - Concrete Forming and Accessories.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 20 00 - Concrete Reinforcing.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type II (Modified for Sulfate Resistance) Portland type.

1. Acquire all cement for entire project from same source or resubmit mill certificates if a different source is required.

B. Fine and Coarse Aggregates: ASTM C 33.

1. Acquire all aggregates for entire project from same source or resubmit aggregate data if a different source is required.
2. Shale or deleterious content shall be no more than 0.5 percent for slabs and water bearing structures and 1 percent for all other concrete.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemical admixtures that contain intentionally added chlorides.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

D. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

E. Accelerating Admixture: ASTM C494/C494M Type C.

F. Retarding Admixture: ASTM C494/C494M Type B.

G. Water Reducing Admixture: ASTM C494/C494M Type A.

H. Shrinkage Reducing Admixture: ASTM C494/C494M Type S.

2.05 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

1. Manufacturers:
   a. SpecChem, LLC; Strong Bond Acrylic Bonder: www.specchemllc.com/sle.
   b. R. Meadows, Inc.; ACRY-LOK-: www.wrmeadows.com/sle.

c. Substitutions: See Section 01 61 00 - Common Product Requirements.

B. CURING MATERIALS

C. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

1. Products must meet NSF requirements.
2. Manufacturers:
   a. SpecChem, LLC; E-Cure: www.specchemllc.com.
   b. R. Meadows, Inc.; 1100-Clear: www.wrmeadows.com/sle.
   c. Substitutions: See Section 01 61 00 - Common Product Requirements.

D. Moisture-Retaining Sheet: ASTM C171.

1. Curing paper, regular.
2. White-burlap-polyethylene sheet, weighing not less than 10 ounces per linear yard, 40 inches wide.

E. Polyethylene Film: ASTM D2103, 4 mil thick, clear.

F. Water: Potable, not detrimental to concrete.

2.06 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For both methods, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete for all structural elements:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 psi.
2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
3. Cement Content: Minimum 520 lb. per cubic yard.
4. Water-Cementitious Material Ratio: Maximum 45 percent by weight.
5. Total Air Content: As specified, determined in accordance with ASTM C231/C231M.
   a. 5-8 percent for concrete exposed to freeze / thaw conditions.
   b. 0 percent entrained for all other conditions.
6. Maximum Slump: 4 inches (prior to high-range water reducing admixtures).
7. Maximum Aggregate Size: 3/4 inch.

2.07 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Engineer not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Concrete shall be placed so that segregation does not occur. Downpipes or tremies shall be used to place concrete as close to its final destination as possible.

H. Contractor shall place concrete in the formwork at its final location as close as possible. Concrete is to be placed in uniform layers. Consolidate concrete by utilizing a mechanical vibrator.

I. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:

1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal. The rubbing shall remove all form marks and surface irregularities and provide a smooth texture and uniform color.
2. Coordinate with requirements of section 09 90 02 High Performance Painting and Coating.

D. Concrete Slabs: All slab finishes must be verified with Engineer prior to concrete placement. Finish to requirements of ACI 302.1R, and as follows:

1. Exterior Concrete Slabs: "Steel trowel with light broomed surface" as described in ACI 302.1R.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot, or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than 7 days.

C. Formed Surfaces:

1. Initial Curing: Start as soon as forms have been removed. Keep continuously moist for not less than seven days by saturated burlap or water-fog spray.
   a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 7 days.
   b. Spraying: Spray water over floor slab areas and maintain wet.
   c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

D. Surfaces Not in Contact with Forms:

1. Slabs and Floors to Receive Epoxy Coated Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than seven days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 7 days.
   b. Spraying: Spray water over floor slab areas and maintain wet.
   c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.

3. Final Curing: Begin after initial curing but before surface is dry.
   a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 45 00 - Quality Control.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

G. Air content shall be tested per ASTM C231. Concrete tested for air shall be sampled for at the point of discharge where pumping is being used.

H. Take and record temperature of all concrete tested.

I. Maintain records of concrete placement. Record date, location, time truck left plant, time truck started emptying, time truck empty, quantity, air temperature, and test samples taken.

J. Test completed water bearing structures as specified in Section 03 96 90. Patch and repair completed structures as required to meet specified requirements.

3.07 PATCHING AND REPAIR

A. Allow Engineer to observe concrete surfaces immediately upon removal of forms. Patch imperfections as specified in Section 03 01 00 per manufacturer's instructions. Areas patched prior to Engineer’s observation and concurrence will require removal of patching material to allow observation. Costs associated with removal and replacement shall be paid by the Contractor.

3.08 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Engineer and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.

C. If concrete tests fail to meet required strength, additional tests will be directed by Engineer. If additional tests fail to confirm required strength, the Contractor shall

pay for all the cost of Work to replace defective concrete. Contractor shall pay for all additional tests and engineering services.

D. Repair or replacement of defective concrete will be determined by the Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

E. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.09 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

B. Do not allow construction loads in excess of final design loads on any structural concrete members without shoring and possible re-shoring.

END OF SECTION 03 30 00

DIVISION 10
SPECIALTIES

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SECTION 10 14 00
SIGNS

GENERAL

1.01 SUMMARY

A. Section includes:

1. Marker signs with post.

B. Related Sections include:

1. Section 01 45 00 - Quality Control.

1.02 REFERENCES

A. ASTM A153/A153M – Zinc-Coated (Hot-Dip) on Iron and Steel Hardware.

1.03 SUBMITTALS

A. Shop Drawings: Furnish in accordance with Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data on composite posts, decals, accessories, and hardware.

PRODUCTS

2.01 MARKER SIGNS AND POSTS

A. Manufacturers:

1. Carsonite International.
2. Approved Equivalent.

B. Materials and Components:

1. Conforming to CUM-375 Composite Utility Marker
2. Width: 3.5 inches.
3. Length: 6.5 feet.
4. Color: Post shall be APWA specified Blue, with reflective decals on blue background with white lettering.
5. Lettering shall be as detailed on the Drawings.

C. Provide with one post puller and utility marker driver.

EXECUTION

3.01 INSTALLATION

A. Install marker posts at the locations and to the lines delineated on the Drawings and in accordance with manufacturer's recommendations.

B. Plumb posts straight, true-to-line, and properly positioned.

C. Attach decals securely to posts at locations as indicated on drawings.

D. Provide 10 additional decals of each type to Owner as spare parts.

3.02 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/2 inch.

B. Maximum Offset From True Position: 2 inches.

C. Components shall not infringe adjacent property lines.

END OF SECTION 10 14 00

DIVISION 26
ELECTRICAL

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SECTION 26 00 00
ELECTRICAL GENERAL CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

A. The General Conditions of these Specifications shall form a part and be included under this section of the Specifications. The Contractor shall provide all supervision, labor, material, equipment, machinery and any other items necessary to complete the electrical systems. All items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated in the Drawings, and as required for complete systems.

1.02 WORK UNDER THIS DIVISION

A. It shall be noted that this Section of the Specifications includes:

1. GENERAL
2. ELECTRICAL REQUIREMENTS

1.03 CODES, RULES, PERMITS, FEES

A. The Contractor shall give all necessary notices, obtain all permits and pay all government and state sales taxes, fees, and other costs, including utility connections or extensions, in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Engineer before request for acceptance and final payment of the work.

B. All materials furnished and all work installed shall comply with the currently adopted Edition of the National Electrical Code, with the requirements of local utility companies, and with the requirements of all governmental departments having jurisdiction.

C. All material and equipment for the electrical portion of the system shall bear the approval label, or shall be listed by Underwriter's Laboratories, Limited Liability company or another Nationally Recognized Testing Laboratory (NRTL) approved by OSHA and the local electrical inspector.

1.04 INTENT

A. It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

1.05 SURVEYS AND MEASUREMENTS

A. The Contractor shall base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and

levels. Verify all measurements at site and check correctness of same as related to the work.

B. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, they shall notify the Engineer, through the General Contractor, and shall not proceed with the work until they have received instructions from the Engineer.

1.06 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. The engineering drawings and details shall be examined for exact locations of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Engineer.

B. The Contractor shall follow drawings in laying out work, and check drawings of other trades to verify spaces in which work will be installed.

1.07 "OR EQUAL"

A. Wherever the words “or equal" or “equal to” or “equivalent” are used in connection with any specified material, it is to be understood that such words mean any material or work of any kind claimed to be an equal in quality to the work or material specified but does not require prior written approval by the Engineer.

B. Wherever the words "approved equal" or "prior approved equivalent" are used in connection with any specified material, it is to be understood that such words mean any material or work of any kind claimed to be an equal in quality to the work or material specified and shall be so approved in writing by the Engineer.

C. It is further understood that no material or work shall be presented to the Engineer as work or material equal to that specified with the full understanding on the part of the manufacturers and agents for the so called "equal" material, and the full understanding on the part of the Contractor, that the Engineer is to use his own judgment in the matter, that his decision is final, and that in the event of an adverse condition, no claim of any sort shall be made against the Owner or Engineer.

1.08 SHOP DRAWINGS

A. The Contractor shall submit for approval, detailed shop drawings of all equipment and all material required to complete the project, and no material or equipment may be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the material or equipment. The shop drawings shall be completed as described by Specification Section 01 33 00 - Submittal Procedures.

1.09 EQUIPMENT DEVIATIONS

A. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the mechanical, electrical, or structural layout, all such redesign and all new drawings and detailing required therefore shall be prepared by the Contractor at his own expense and approved by the Engineer.

B. Where such approved deviation requires a different quantity and arrangement of wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system at no additional cost to the Owner.

1.10 COOPERATION WITH OTHER TRADES

A. This Contractor shall give full cooperation to other trades and shall furnish in writing to the Contractor, with copies to the Engineer, any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. Where the work of the Contractor will be installed in close proximity to, or will interfere with the work of other trades, they shall assist in working out space conditions to make a satisfactory adjustment. If the Contractor installs their work before coordinating with other trades or so as to cause any interference with work of other trades, they shall make the necessary changes in his work to correct the condition without extra charge.

C. The Contractor shall furnish to other trades, as required, all necessary shop details for the proper installation of work and for the purpose of coordinating adjacent work.

D. Refer to other Divisions of the Specifications for equipment furnished by others and work required thereof by the Contractor.

1.11 PROTECTION

A. The Contractor shall protect all work and material from damage by their work or workmen and shall be liable for all damage thus caused.

B. The Contractor shall be responsible for work and equipment until finally inspected, tested, and accepted; contractor shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site, which is not immediately installed. Contractor shall close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

1.12 SCAFFOLDING, RIGGING, HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any electrical equipment and electrical apparatus furnished. Remove scaffolding, rigging, hoisting, and services from premises when no longer required.

1.13 MATERIAL AND WORKMANSHIP

A. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new of first-class quality, and shall be furnished, delivered, erected, connected, and finished in every detail, and shall be so selected and arranged as to fit properly into the available spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Engineer shall be furnished.

B. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation or work, together with all skilled workmen, helpers, and labor required to unload, transfer, erect, connect, adjust, start, operate, and test each system. The job superintendent shall be a Master Electrician licensed in the State where the work is being performed.

C. Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval of the Engineer in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.14 APPLICABLE STANDARDS

A. Provide work in accordance with applicable rules, codes, ordinances and regulations of local, state, federal governments, and other authorities having lawful jurisdiction. Conform to the latest editions and supplements of codes, standards, and recommended practices.

B. Drawings and specifications indicate minimum construction standards. Should any work indicated be substandard to any ordinances, lower codes, rules or regulations bearing on work, the Contractor shall promptly notify the Engineer in writing, through the General Contractor, of any necessary changes to be adjusted. However, if Contractor provides any work knowing it to be contrary to any ordinances, laws, rules and regulations, they shall thereby have assumed full responsibility and bear all costs involved for correction and compliance. In any instance where the specifications call for materials for construction of a better quality or larger size than required by codes, provisions of these specifications shall take precedence. Codes shall govern in case of direct conflict between codes, plans and specifications.

1. Safety Codes:
    a. National Electrical Safety Code Handbook H30-National Bureau of Standards

b. Occupational Safety and Health Standard (OSHA) - Department of Labor

2. National Fire Codes:
   a. NFPA 70 - NATIONAL ELECTRIC CODE, current adopted Edition.
3. Underwriters Laboratories, inc.:
   a. UL 508A Standard
   b. All applicable UL standards as referenced in other section.
4. Third Party Certification:
   a. All equipment not bearing a UL listing shall be provided with a third-party certification stamped by a registered Professional Engineer licensed in the state of which the work is being performed.
5. North Dakota State Electrical Board:
   a. Laws, Rules, Wiring Standards, and all applicable local state standards.

1.15 TESTS AND OPERATION RECORDS

A. General: Test all equipment installed under this specification and demonstrate its proper operation to the Engineer. No equipment shall be tested or operated for any other purpose, such as checking motor rotation, until it has been fully lubricated in accordance with manufacturer's instructions and, if it is a centrifugal pump, until it has been connected to piping systems and supplied with sufficient water so that it will not run dry.

1. Any defects in workmanship, material, equipment or any grounds or short circuits shall be corrected by the Contractor before final acceptance.
2. Submit a searchable electronic copy or a minimum of three (3) copies of data noted below to the Engineer prior to final inspection.
3. Maintain a marked set of drawings to record all deviations made from routes, locations, circuiting, etc. shown on contract drawings. Prior to final inspection submit one new set of project drawings with deviations and changes clearly indicated.

B. Testing: The entire electrical system shall be tested by Contractor in presence of the Engineer. Every local switch, panelboard, service breaker, safety switch, and circuit breaker shall be operated under load conditions. Every fixture and equipment tested and operated. Tests shall include any tests specified in any part of this section.

1. The Contractor shall measure resistance of electrical system with a "Megger" from busses of main switch to ground with main breaker open, and bonding jumper between neutral and ground temporarily removed. Values are to be determined with all panelboards, motor controls and switch circuits open. If any value measured is less than 100,000 ohms, each feeder shall be measured and must exceed those set forth in Article 110 of National Electrical Code, before they shall be accepted. Typewritten test results shall be furnished to the Engineer.

C. Recording and Distribution

1. Record nameplate horsepower, amperes, volts, phase, efficiency, service factor and other necessary data on motors, and other electrical equipment furnished and/or connected under this contract.
2. Record motor starter catalog number, size and rating and/or catalog number of thermal overload units installed in all motor starters furnished and/or connected under this contract. See motor starter specifications for instructions for proper sizing of thermal overload units.
3. Record ampere per phase at normal or near normal loading of each item of equipment furnished and/or connected.
4. Record voltage and ampere per phase readings taken at service entrance equipment after completion of project with operation at normal electrical load.
5. Record all VFD settings, solid-state motor controller settings, electronic overload relay settings, relay settings, device settings, and related electronic equipment settings.
6. Record all instrumentation and device calibration settings.
7. Distribute copies of all recorded information to the Engineer along the project O&M manuals.

1.16 DEMONSTRATION OF COMPLETED ELECTRICAL SYSTEMS

A. General: Upon completion of entire electrical systems, Contractor shall demonstrate to Engineer's satisfaction that all installed electrical systems are in perfect operating condition, that they perform all power and control functions intended and that they are installed in strict accordance with project drawings and specifications.

B. Materials: Contractor shall provide all necessary testing equipment, tools, materials, dummy loads, etc., required to properly demonstrate performance.

1.17 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide O/M manuals per Specification Section 01 78 23 - Operation and Maintenance Data

PART 2 ELECTRICAL REQUIREMENTS

2.01 BASIC MATERIALS

A. General: Material and equipment installed under this contract shall be new, unused, and without damage. The physical size of equivalent or substitute equipment shall not be larger than the space provided including space required for access and maintenance of equipment.

END OF SECTION 26 00 00

SECTION 26 05 02
EXCAVATING, TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Provide all trenching/backfill/compaction/surface restoration required to install all electrical as noted in drawings and specifications.

B. Related Work:

1. Section 26 05 34 - Conduit
2. Division 31

1.02 QUALITY ASSURANCE:

A. Engineer may have compaction tests taken by an independent testing laboratory. Cost will be paid by Owner unless tests indicate compaction does not meet Specifications in which case costs of initial test and any retesting will be paid by the Contractor and not charged to the Owner.

B. Properly protect existing surfaces and items not included in this work and repair any damage to original condition.

C. Take precautions to guard against movement, settlement, collapse, or other damage of existing construction and finish grade and repair any damage to original condition.

D. Perform construction stakes, lines, and grades under direct supervision of a Registered Land Surveyor or Registered Civil Engineer.

1.03 EXISTING CONDITIONS:

A. Determine exact locations of existing utilities before commencing work. Contractor is responsible for damages incurred by his failure to locate and preserve underground utilities. It is Contractor's responsibility to contact "One Call Locators" prior to performing any excavation.

PART 2 PRODUCTS

2.01 GENERAL BACKFILL REQUIREMENTS

A. SPECIAL FILL GRAVEL (INSIDE BUILDING LINE):

1. Washed type with 100% passing 3/4" sieve and gradation to ensure compactibility with no more than 5% passing No. 200 sieve.

B. Outside Building Line: Native backfill.

PART 3 EXECUTION

3.01 INSTALLATION

A. Clear trenching work area in accordance with Division 31 requirements.

B. Excavate to depths as indicated on drawings or as required by NEC, whichever is greater.

C. Provide electrical ribbon marker tape above conduits in each trench.

D. Notify Engineer immediately if during progress of work, subsurface conditions are encountered which are different from those ordinarily encountered.

E. Excavated material, free from foreign material, may be used for backfilling outside building and rough grading. Stockpile as directed by Engineer. Remove any excess from site.

F. Fill excavation below required depth with compacted special gravel fill.

G. Protect bottom of excavation from frost and do not place structures or conduit on frozen ground.

H. FILL WITHIN BUILDING (Under Concrete Slabs on Grade):

1. Place and compact fill in successive layers not to exceed eight (8) inches before compaction. Compact to minimum of 95% per ASTM D698.

I. At contractor's option, accessible nonorganic material from building excavating may be used for fill within building.

J. Place a six-inch layer of Special Fill Material immediately below the floor slab.

K. BACKFILL OUTSIDE BUILDING:

1. Do not start backfilling until the work which will be covered is completed, areas are free of foreign material and Engineer has approved.
2. Place and compact fill in successive layers not to exceed eight (8) inches before compaction. Compact to minimum of 95% per ASTM D698.

L. Nonorganic material excavated from foundation areas may be used as backfill in exterior areas.

M. Special care shall be given to ensure that the backfill under and adjacent to the transformer/generator pad(s) is fully compacted so that the pad doesn't settle.

END OF SECTION 26 05 02

SECTION 26 05 19
POWER AND INSTRUMENTATION CABLE - LESS THAN 600V

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish and install all conductors to accomplish the circuiting, control and power distribution as shown in the Drawings.

B. Related Work:

1.02 REFERENCE STANDARDS:

A. UL 486A-486B - Wire connectors

B. NEMA WC 70

C. NEMA WC30-1976

D. NFPA 70 (National Electrical Code)

E. NFPA 79

1.03 DELIVERY, STORAGE, AND HANDLING:

A. Deliver conductors to project on standard coils or reels and suitably protected from weather and damage during storage and handling.

PART 2 PRODUCTS

2.01 CONDUCTORS

A. Type P1 - 600V Rated General Purpose Single Conductor Cable

1. Construction:
   a. No. 14 AWG and larger: Stranded Copper, (THHN/THWN-2). Solid Copper is acceptable for lighting and branch circuits.
   b. All conductors shall contain factory color coded insulation in all standard colors to match the voltage level used.
   c. Sequential footage markers shall be factory installed on the insulation jacket.
   d. Provide Cable Tray (CT) rated cable where installed in cable tray.
   e. Aluminum conductors are not permitted.
2. Feeder Conductors:
   a. 98 percent conductivity copper, 600-volt insulation.
3. Branch Circuit Conductors:
   a. 98 percent conductivity copper, 600-volt insulation.
   b. Conductors smaller than No. 14 AWG are not permitted except in control panel.
4. Project Use Areas:
   a. All general use indoor building circuiting.
   b. Not allowed for any VFD output circuitry

5. Manufacturer:
    a. Service Wire Co.
    b. Okonite Co.
    c. Southwire
    d. Belden
    e. Alpha Wire

B. Type P2 - 600V Rated Special Purpose Single Conductor Cable

1. Construction:
    a. XHHW-2 insulation which is moisture, heat, and flame-retardant cross-linked polyethylene covered with an overall flame retardant, moisture and sunlight resistant PVC jacket.
    b. Stranded Copper
    c. All conductors shall contain factory color coded insulation in all standard colors to match the voltage level used.
    d. Sequential footage markers shall be factory installed on the insulation jacket.
    e. Provide Cable Tray (CT) rated cable if installed in cable tray.
    f. Aluminum conductors are not permitted.
2. Project Use Areas:
    a. All 600V and less service entrance conductors and feeders routed underground from the exterior to the interior.
3. Manufacturer:
    a. Service Wire Co.
    b. Okonite Co.
    c. Southwire
    d. Belden
    e. Alpha Wire

C. Type S1 - Signal Cable - Single Pair - Shielded/Twisted

1. Construction
    a. NFPA 70, Type CMP Single pair, twisted, 100% shield coverage, Class B, 16 AWG, stranded (19 x 29) tinned copper conductors (7 strand minimum).
    b. 600V minimum insulation rating
    c. 15 mil (nominal), 90 deg C PVC primary insulation with a flame retardant, low smoke PVC, plenum rated.
    d. Conductors shall be shielded with a .35 x 5 mil (min.), 100% coverage, aluminum or copper mylar tape shield, or equal with an 18-gauge strand copper drain wire.
2. Ratings/Listings:
    a. Flame Resistance: Comply with UL 1685 & NFPA 262
    b. UL Temperature Rating: 75 deg C Dry, 90 deg C wet
    c. ICEA S-73-532, S-61-402
3. Project Use Areas:
    a. Use cable for all control circuiting requiring one shielded twisted pair from a control panel to a field instrument or similar application.
4. Manufactures:
    a. Service Wire Co.

b. Okonite Co.
c. Southwire
d. Belden
e. Alpha Wire

D. Type S4 - Magnetic Flowmeter Transmitter Cable

1. Furnish and install new continuous length of signal cables between magnetic flowmeters and transmitters as indicated on the Drawings. Coordinate scope and supply with magnetic flowmeter systems manufacturer.
2. No splices shall be allowed in these types of signal cable installations. The length of signal cables shall be installed in one continuous length from flowmeter to transmitter.
3. Assumed Cable Manufacturer / Type for Bidding Purposes:
   a. Coil Drive Cable: 14 AWG Belden 8720, Alpha 2442, or manufacturer approved equivalent.
   b. Signal Cable: 20 AWG Belden 8762, Alpha 2411, or manufacturer approved equivalent.
   c. Combination cable is acceptable if it meets individual specifications of signal and coil drive cables and the manufacturer.
   d. Confirm all proposed cables with Manufacturer of equipment before installation. In the majority of installations, the manufacturer of the flowmeter equipment furnishes the required specialty flowmeter cables for installation by the Contractor. It is the Contractor's responsibility to confirm and coordinate the exact requirements.

2.02 CORD CONNECTOR GRIPS

A. Manufacturer: Killark "Z" series or equal

B. Type: Aluminum cord connector, stainless steel mesh grips, straight or 90° as required in eliminating sharp cable bending radii.

C. Use: To support all cables/cords from the enclosure at their point of use and/or wherever cables/cords enter or leave the bottom of conduit risers (above grade). Required for all cord connections to motors or enclosures.

2.03 BOLTED, PRESSURE TYPE CONNECTORS

A. Manufacturer: Burndy or equal

B. Use: Connecting conductors to busbars, suitable for copper and aluminum conductors.

C. Size: As required for conductor.

2.04 SOLDERLESS CONNECTORS

A. Manufacturer: 3M "Scotchlok" or equal

B. Type: Twist-on, spring tension.

C. Use: With copper conductors only.

PART 3 EXECUTION

3.01 INSTALLATION

A. All conductors shall be installed within conduit or approved raceway unless noted otherwise on drawings.

B. Draw conductors into conduit only after conduit system is complete. Install in a manner so as not to injure insulation.

C. Use stranded, copper conductors only. Solid conductors are not acceptable.

D. Make splices on branch circuit conductors with solderless stapleless, mechanical wire connectors.

E. Tighten bolted, pressure type connectors to manufacturer's recommendations.

F. No. 10 AWG and smaller shall be stranded copper for all motor and control circuits. Branch circuits for lighting and convenience outlets shall be solid copper.

G. All branch circuit homeruns greater than 50 feet shall be #10 minimum.

H. Make splices and terminations in control panel by using bolted, pressure type connections. Install according to manufacturer's recommendations.

I. Provide strain relief cord connectors and stainless-steel mesh on all cords entering motor termination boxes, junction boxes or conduits.

J. Use factory color coded conductors with separate color for each phase and neutral conductor by integral pigmentation for all conductor sizes.

K. Use following codes:

CONDUCTOR SYSTEM VOLTAGE-120/208, THREE PHASE

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Equipment Ground	Green

CONDUCTOR SYSTEM VOLTAGE-120/240, THREE PHASE

Phase A	Black
Phase B	Orange
Phase C	Blue
Neutral	White
Equipment Ground	Green

CONDUCTOR SYSTEM VOLTAGE-120/240, SINGLE PHASE

Phase A	Black
Phase B	Red

Neutral	White
Equipment Ground	Green

CONDUCTOR SYSTEM VOLTAGE-277/480, THREE PHASE

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	Gray
Equipment Ground	Green

L. Lace or clip groups of feeder conductors in control panels, pull boxes, and wireways.

M. Use wiring pulling lubricant for pulling No. 4 AWG and larger wire.

N. Splice only in accessible junction or outlet boxes.

END OF SECTION 26 05 19

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SECTION 26 05 34
CONDUIT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish and install a complete conduit system for all conductors. Low voltage control conductors and fiber optic cabling shall be installed within the conduit as well.

B. Related Work:

1. Section 26 05 02 - Excavating, Trenching And Backfilling
2. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
3. Section 26 05 37 - Boxes

1.02 REFERENCE STANDARDS:

A. U.L. 6 - Rigid metal conduit.

B. U.L. 360 - Liquid-tight flexible steel conduit.

C. U.L. 651 - Rigid non-metallic conduit.

D. U.L. 1203 - Explosion-Proof Electrical Equipment for use in Hazardous Locations

E. U.L. 1684 - Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

F. UL 2515 - Above Ground Thermosetting Resin Conduit (RTRC) and fittings.

G. UL 2420 - Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

H. NEMA Standard Publication TC-2 - Rigid PVC for underground installations.

I. NEMA Standard Publication RN 1-2005 – PVC coated rigid steel conduit.

1.03 DELIVERY, STORAGE AND HANDLING:

A. Store in a dry area, protected from the weather.

PART 2 PRODUCTS

2.01 RIGID METAL CONDUIT

A. Manufacturer: Equal to the Wheatland Steel Company

B. Type: Steel heavy wall; galvanized unless noted otherwise on Drawings.

C. Minimum trade size is 3/4-inch; other sizes as required by NEC based on quantity of conductors.

2.02 PVC EXTERNALLY COATED RIGID CONDUIT

A. Manufacturer: Equal to Plasti-Bond

B. Type:

1. PVC externally coated, galvanized steel.

C. Minimum trade size is 3/4"; other sizes as required by NEC based on quantity of conductors.

D. The PVC coated galvanized rigid conduit must be ETL Verified to the Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure for 200 hours. The PVC coated galvanized rigid conduit must bear the ETL Verified PVC-001 label to signify compliance to the adhesion performance standard.

2.03 FLEXIBLE METAL CONDUIT (LIQUID-TIGHT)

A. Manufacturer: Equal to Alflex

B. Type: Steel

C. Weatherproof covering

2.04 EXPANSION FITTINGS

A. Manufacturer: Equal to OZ Electrical Manufacturing Company.

B. Minimum trade size is 3/4-inch.

C. Material type to match conduit.

2.05 HANGERS AND SUPPORTS

A. Manufacturer: Equal to B-Line Products.

2.06 SURFACE METAL WIREWAY

A. Manufacturer: Equal to Hoffman or Walker

B. Type: Lay-in with hinged cover and suitable fittings. Provide integral barrier where shown on the Drawings.

C. NEMA 12, NEMA 4 or NEMA 4X construction as called for on Drawings.

D. All areas noted as Class I, Division 1, Group D or Class I, Division 2, Group D shall require equipment listed for use in those specific areas.

2.07 NON-METALLIC CONDUIT - PVC (HEAVY WALL)

A. Manufacturer: Equal to Carlon.

B. Minimum trade size is 3/4-inch.

C. Type: Schedule 80 polyvinyl chloride, except where Schedule 40 is specifically called for on Drawings.

2.08 NON-METALLIC EXPANSION FITTINGS

A. Manufacturer: Equal to Carlon.

B. Type: Suitable for use with nonmetallic conduit.

C. Minimum trade size is 3/4-inch.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Size conduits as shown on the Drawings or as required by National Electrical Code (whichever is larger) for number and size of conductors installed.

B. The minimum trade size for home runs is 3/4-inch.

C. Contractor shall not exceed 270 degrees of bend in any single conduit run without an additional pull point unless otherwise noted in drawings.

D. All raceways shall have an equipment ground conductor installed. The raceway shall not be utilized as an EGC.

E. Support all conduits from structural system, independent of ductwork, ceiling system supports and main runners. Do not support conduit from conduit.

F. Cut conduit joints square and ream smooth. Make bends with an approved bender or utilize standard conduit elbows.

G. Building walls are mainly concrete or concrete blocks. Contractor shall core drill walls or coordinate reinforced, boxed out areas as required to install all conduit in a neat and workmanlike manner. Contractor shall also patch all wall penetrations and prepare the surface for final paint by General Contractor. Coordinate routing of larger conduits (3” and larger) with other trades and with Field Engineer prior to installation.

H. Contractor shall provide sleeves or reinforced concrete boxed out openings through footings for all underground conduits. Coordinate with General Contractor.

I. Securely fasten conduit and raceways with malleable iron clamps (hot dipped galvanized, with clamp backs), or galvanized unistrut and hangers with suitable fastenings for all indoor dry applications. Utilize stainless steel unistrut and clamps for all exterior applications, indoor damp/corrosive areas, and all areas as noted on the Drawings. The intent is to keep an air gap between conduit and finished wall surfaces to reduce the potential of moisture induced corrosion. All anchors shall be lead, expansion type with stainless steel hardware. Route all conduits parallel to and at right angles to building lines. Conduits mounted directly in contact with wall surface will not be acceptable.

J. Tie wires to hang or strap conduits are not permitted.

K. Route conduit continuous from outlet to outlet, outlet to cabinets, outlet to pull or junction boxes. Secure conduit to all boxes with locknuts and bushings in such a manner that each system is electrically continuous throughout.

L. Surface mount conduit in all areas, unless noted otherwise. All conduits and outlet boxes on the building exterior shall be flush mounted where possible. If not, install conduits within the building and then penetrate the wall directly into the back of light/outlet/etc. Intent is to eliminate/minimize the usage of surface mounted conduit on the exterior face of the building.

M. Cap ends of conduit to prevent entrance of foreign materials during construction.

N. Locate conduits poured in concrete entirely in the middle 1/3 of the concrete member.

O. Provide a 4-inch-high watertight barrier for conduits that pass vertically through a floor with a metal sleeve or concrete curb.

P. Provide “link seal” around all conduits penetrating exterior walls/foundations and wet wells. Nuts on the link seal shall remain accessible from inside the building once link seal is installed. Non shrinking grout is acceptable for penetrations above finished grade.

Q. Below grade non-metallic conduit shall be transitioned to PVC Coated Rigid Steel or RTRC (XW) before exposing above grade. Transition shall be made via below grade transition couplings to PVC Coated Rigid Steel or RTRC (XW) elbows/sweeps.

R. Provide watertight installation where conduits pass through roof, wall or waterproofing membranes.

S. Conduit systems must be installed completely before conductors are pulled in.

T. Repair any damage done to insulation or interior vapor barrier where any conduit enters air plenums.

U. Fill conduits which can admit air to or release air from air plenums through the connecting conduit system with sealing compound.

V. Provide firestopping around all conduits penetrating fire rated walls as determined by the Architect and Engineer.

3.02 RIGID METAL CONDUIT

A. <u>Metallic:</u>

1. Rigid Metal Conduit is required for all exposed conduits unless otherwise noted on the Drawings.
2. Paint rigid metal conduit that is in contact with earth with heavy coat of bitumastic paint. Paint couplings after assembly. Where bitumastic paint is applied the paint must be thoroughly dried before backfilling.
3. Fittings type to be threaded. Use threaded hubs (equal to Myers hub) where rigid conduit is connected to a thread less box or enclosure for indoor and outdoor applications. Lock nut with O-Ring is not an acceptable alternative.

3.03 FLEXIBLE METAL CONDUIT (LFMC):

A. Use rain tight flexible metal conduit with rain tight fittings for final connections to motors (non-hazardous areas), and field instrumentation (non-hazardous areas) that do not come with factory installed cords. Minimum trade size is 1/2-inch.

B. Length shall be limited to trade size: 3/4" or less = 36"; 1" or larger = 48". Minimum 12". Use permitted only to avoid transmission of vibration or noise and where flexibility to entry is required. All other uses shall be approved by the Engineer.

C. Engineer reserves the right to request re-work of all flexible metal conduit exceeding lengths exceeding specified or installed where not permitted as noted above.

D. Flexible Metal Conduit shall not be used to transition through walls under any circumstance.

3.04 RIGID NON-METALLIC PVC CONDUIT (HEAVY WALL)

A. Use rigid non-metallic, Schedule 80 PVC conduit for all direct burial and exposed wet, caustic or corrosive installations unless specifically noted otherwise on Drawings. Cut conduit square with round edges removed from ends to protect the wires from abrasion. Make connections by solvent welding. Install fittings in accordance with the manufacturer's recommended procedures. All elbows 2” and larger shall be rigid metal conduit. Provide expansion joints wherever there are long runs of conduit, and a wide temperature differential exists. Use PVC coated RMC sweeps whenever penetrating through concrete floors.

B. Provide grounding conductor in all control circuits, branch circuits and feeder conduits.

C. Typical applications included underground and in chemical or caustic areas.

END OF SECTION 26 05 34

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SECTION 26 05 37
BOXES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish and install all outlet boxes, junction boxes and pull boxes required to accomplish device and equipment installation, wire pulling shown on the Drawings and to comply with National Electric Code requirements for conduit and conductor installation.

B. Related Work:

1. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
2. Section 26 05 34 - Conduit

1.02 SHOP DRAWINGS AND PRODUCT DATA:

A. Submit in accordance with Specification Section 01 33 00 - Submittal Procedures.

1.03 WORK INSTALLED BUT FURNISHED BY OTHERS:

A. Back boxes for selected items of equipment are furnished by the equipment supplier. Refer to individual Specification Sections for mounting, size, etc.

1.04 REFERENCE STANDARDS:

A. U.L.

B. NEMA

C. NFPA 70 - National Electrical Code (NEC), current adopted Edition.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Store materials in a dry area, protected from the weather.

PART 2 PRODUCTS

2.01 PULL BOXES

A. Manufacturer: Hoffman or Equal

B. Type: Metal construction, conforming to National Electrical Code, with screw on or hinged cover, unless specifically noted otherwise on drawings.

C. NEMA 12, 4, 4X, 7 as noted in the drawings.

D. Overlapping covers with flush head cover retaining screws, prime coated for flush mounted pull boxes.

2.02 SURFACE MOUNTED OUTLETS

A. Manufacturer: Crouse Hinds, Appleton, or equal.

B. Type: FS or FD Condulet Cast Device Boxes (# gangs as required).

C. Matching iron alloy (Feraloy) covers as required for device(s) used.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate work with other trades to avoid potential obstructions within dedicated equipment spaces and work clearances as defined in the NEC.

B. Clean interior of boxes to remove dirt, debris, and other foreign materials.

C. Do not use sectional or handy boxes.

D. Protect outlet boxes from entrance of foreign materials, including paint, during the construction period.

E. Surface mount all interior outlet boxes.

F. Provide seal offs per NEC Articles 500, and 501 as required.

G. Install outlets at the heights and approximate designated positions as shown on the Drawings or indicated in Specifications, unless specifically noted otherwise.

H. Locate outlets to clear piping, access hatches, and other obstructions.

I. Install switch outlets on latch side of door except where type of construction dictates otherwise.

J. Mounting heights indicated on Drawings are to center line of outlet unless indicated otherwise.

K. Pull boxes and junction boxes are not indicated on Drawings except for special requirements. Install pull boxes or junction boxes as required to facilitate pulling wire. Size pull boxes and junction boxes as required by the National Electrical Code.

L. Mount receptacles in the equipment rooms and in other unfinished areas at 48 inches unless noted otherwise on drawings. Match mounting heights of similar existing devices in the immediate area if present.

M. All conduits entering pull boxes shall have the conduit ID as shown on the cable and conduit schedule clearly labeled on the inside of the pull box using permanent marker.

N. Provide ventilated skirt under junction boxes where indicated on the drawings.

END OF SECTION 26 05 37

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Equipment to be identified includes panelboards, disconnects, transformers, relays, contactors, system control panels, variable frequency drives, separately mounted control stations, pilot lights, control switches and all wires and terminations.

B. Related Work:

1. Section 26 05 34 - Conduit
2. Section 40 70 01 - Instrumentation General Requirements

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code (NEC), current adopted Edition.

B. OSHA

PART 2 PRODUCTS

2.01 INSTRUCTION SIGNS

A. Plastic sandwich-type acrylic based construction of contrasting colors equal to Rowmark. Engraving through the top layer exposes inner layer.

B. Color: Black with white letters.

C. Letters: 1/8-inch height, standard block type.

D. Punched or drilled for mechanical fasteners. Fasteners shall be self-tapping stainless-steel screws with nuts and flat lock washers.

2.02 EQUIPMENT IDENTIFICATION LABELS

A. Self-adhered, engraved, laminated acrylic or melamine label.

B. Color: Black with white letters.

C. Letters: 3/8-inch minimum height, standard block type.

D. Punched or drilled for mechanical fasteners. Fasteners shall be self-tapping stainless-steel screws with nuts and flat lock washers.

2.03 WIRE MARKERS

A. All wires requiring circuit indication shall be permanently fastened type written. No handwritten labels shall be acceptable.

B. Wire markers shall be Shrink Tube or Self Laminating type as specified below.

C. Shrink Tubing type wire markers:

1. All shrink tube type markers shall be type written with circuit indication.
2. 3:1 heat-shrinking type
3. Resistant to chemicals, grease, oil and cleaning agents.
4. Material shall be Polyolefin with smudge-proof finish.
5. Material shall be cold resistant and flame-retardant
6. Temperature range: -67 to 275 degrees Fahrenheit.
7. Manufacturer: Brady or equal

D. Self-laminating type wire markers:

1. All self-laminating type markers shall be type written with circuit indication
2. Vinyl label with acrylic adhesive
3. Label shall have overlaminate included sized appropriately to wrap cable one and a half times or completely cover printed area, whichever is greater.
4. Label shall be rated for indoor and outdoor use.
5. Temperature range: -94 to 140 degrees Fahrenheit.
6. Material shall be flame-retardant.
7. Resistant to chemicals, humidity, oil, water and weather.
8. Manufacturer: Brady or equal

2.04 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and OSHA 29 CFR 1910.145.

B. Self-adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated. Weather resistant, non-fading, metal backed or baked enamel signs to be used for outdoor installations.

2.05 POWER SOURCE LABELS FOR EQUIPMENT AND DEVICES

A. Self-adhered label, installed on the front cover, door, or other access to equipment and devices unless otherwise indicated. Weather resistant, non-fading, metal backed or baked enamel signs to be used for outdoor installations.

B. Self-adhesive labels shall be Brady or equal.

C. Apply to all panels, junction boxes, receptacle faceplates, switch faceplates, front covers, doors, or other access to equipment unless otherwise indicated. See Part 3 for Execution.

2.06 CABLE AND CONDUIT IDENTIFICATION

A. Each cable or conduit shall be identified using a permanent identification system consisting of a round 304 stainless steel engraved tag secured to the cable or conduit 6" from entry at both ends. Install tag in suitable location readable from normally accessed side.

B. The following information shall be provided on each conduit label:

1. Line #1 - Conduit ID found on the Cable and Conduit Schedule (where applicable)

PART 3 EXECUTION

3.01 INSTALLATION

A. Clean surface before installation of any self-adhered labels.

B. Identify with black acrylic based placard with white engraved letters mounted with drive pins or other approved fasteners.

3.02 DISCONNECTS AND STARTER ENCLOSURES

A. Use the following for identifying disconnects or starter enclosures per NEC 110.22 (A).

1. EXAMPLE: Raw Wastewater Pump #1
480 volt, 3 phase, 300 H.P.
Fed from: DP-X, Pole Position XX

3.03 POWER SOURCE LABELS FOR EQUIPMENT AND DEVICES

A. Provide a mechanically fastened power source label at all equipment and devices with the following information:

1. EXAMPLE: LPA-11 or LPA-13,15 or DPA-1,3,5.

B. All equipment and devices such as panels, junction boxes, receptacle faceplates, switch faceplates, front covers, doors, or other access to equipment shall include an adhesive backed label that indicates the power source for said equipment.

3.04 CONDUIT AND CIRCUIT LABELING AT POINT OF ENTRY TO LARGE ENCLOSURES

A. Use a black permanent marker and hand label all conduits and circuits at the point of entry to large enclosures (control panels, pullboxes, junction boxes, motor control centers, etc.) with the conduit/circuit number from the Cable and Conduit Schedule.

B. Labeling shall be done on the interior of the enclosure or on the floor near each conduit/circuit, or on the conduit itself in some cases. All conduits/circuits that enter enclosures shall be labeled.

C. Labeling with a permanent marker shall be in addition to any circuit tags installed around the cables themselves.

3.05 GROUNDED (NEUTRAL) CONDUCTOR IDENTIFICATION

A. Follow NEC 200.6. In addition to the part (D) identification requirements for the grounded conductor when different systems are in close proximity - Example: Non-Emergency UPS and Utility power sharing a common junction box or multi-channel raceway. Where broken, to prevent crossing of grounded/neutral conductors, the non-utility system's neutral wires shall all have wire markers identifying it as the system to which it belongs.

END OF SECTION 26 05 53

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SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnish and install all wiring devices and device plates where shown on the Drawings.

B. Related Work:

1.02 WORK INSTALLED BUT FURNISHED BY OTHERS

A. Where indicated, install devices supplied by Division 1 through 40.

1.03 QUALITY ASSURANCE

A. NEMA

B. U.L. Listed

C. NFPA 70 - National Electrical Code, current adopted Edition

1.04 SHOP DRAWINGS AND PRODUCT DATA

A. Submit in accordance with Specification Section 01 33 00 - Submittal Procedures. Clearly indicate device type, voltage, amperage, NEMA configuration, color.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store in a dry area, protected from the weather.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Specification Section01 78 23 - Operation and Maintenance Data, a list of all devices used, including manufacturer and type.

PART 2 PRODUCTS

2.01 GROUND FAULT RECEPTACLE

A. Manufacturer: P&S 1597 Series, Eaton SGF15, Leviton:

1. 15 A Capacity
2. Gray
3. 120 Volt with 5 milliampere trip

B. Manufacturer: P&S 2097 Series, Eaton SGF20, Leviton:

1. 20 A Capacity
2. Gray
3. 120 Volt with 5 milliampere trip

C. Other Manufacturers and models must be approved by Engineer

2.02 DEVICE PLATES

A. Provide device wall plates per Specification Section 26 05 37 - Boxes and as required by NEC.

2.03 WEATHERPROOF COVERS

A. Provide weatherproof device covers on all exterior devices, wet area devices, chemical room devices and in other areas indicated on the Drawings and as required by the NEC.

B. Unless indicated otherwise, covers shall be of the “weather protected while in use” variety and shall consist of the following:

1. Exterior Applications: cast aluminum, lockable, sized as required for the application. Manufacturer/Model: Intermatic / Type #WP10, or equal.
2. Wet, Chemical or Caustic Interior Areas: clear plastic or PVC construction, Carlon, Intermatic WP5100 Series, or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install devices and device plates where shown on the Drawings.

B. All receptacles and switches listed within this section shall be installed with the ground side down.

C. Provide blank plates for unused openings.

D. See Section 26 05 53 - Identification for Electrical Systems for engraving requirements for pilot lights and pilot lighted switches.

3.02 CLEANING

A. Clean exposed surfaces to remove dirt, paint, and other foreign material and restore to match original factory finish.

3.03 PROTECTION

A. Protect installed products from subsequent construction operations.

END OF SECTION 26 27 26

DIVISION 31
EARTHWORK

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SECTION 31 05 13
SOILS FOR EARTHWORK

GENERAL

1.01 SUMMARY

A. Section includes:

1. Subsoil materials.
2. Topsoil materials.

B. Related Sections include:

1.02 REFERENCES

A. Reference Standards include:

1. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
2. ASTM D2487 - Classification of Soils for Engineering Purposes.
3. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
4. ASTM D6938 - Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.03 SUBMITTALS FOR REVIEW

A. See Section 01 33 00 - Submittal Procedures: Procedures for submittals.

B. Samples: Submit, in air-tight containers, 10 pound sample of each type of fill to testing laboratory.

1.04 QUALITY ASSURANCE

A. Section 01 45 00 - Quality Control: Field Samples.

B. Material Source: Submit name of imported material supplier(s). Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PRODUCTS

2.01 SUBSOIL MATERIALS

A. Subsoil: Excavated material; Imported borrow, and select or local borrow. All subsoil shall be graded free of lumps larger than 3 inches in any dimension; graded free of gravel or rocks larger than 2 inches in any dimension; and free of debris, waste, frozen materials, vegetation and other deleterious material.

1. Type S1: Fine sand and gravel, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Conforming to ASTM D2487 Group Symbol GM, GC, SM, and SC.

2. Type S2: Silt, silty-clay, inorganic clays, and silts of medium to high plasticity and a maximum liquid limit of 40. Conforming to ASTM D2487 Group Symbol CL, ML, CH, and MH.
3. Type S3: Non-used; All frozen material, vegetation, trash, rocks, and concrete and bituminous chunks having a dimension exceeding 3 inches.

2.02 TOPSOIL MATERIALS

A. Topsoil: Excavated material; Graded free of roots, rocks larger than ¾ inches, subsoil, debris, large weeds, and foreign matter.

1. Type S4: Imported or Re-used; Friable loam. Acidity range (pH) of 5.5 to 7.5 containing a minimum of 4 percent and a maximum of 25 percent organic matter. Conforming to ASTM D2487 Group Symbol OL and OH.

2.03 SOURCE QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Testing and analysis of soil material.

B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D1557 and ASTM D6938.

C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D2487.

D. If tests indicate materials do not meet specified requirements, change material and retest.

E. Provide materials of each type from same source throughout the Work.

EXECUTION

3.01 SOIL REMOVAL

A. Excavate topsoil and subsoil required from all areas designated for construction.

B. Remove lumped soil, boulders, rock, debris, tree stumps and roots, and large weeds.

C. Stockpile excavated material in area acceptable to Owner and remove excess material not being used, from site.

3.02 STOCKPILING

A. Stockpile materials in an area acceptable to Owner.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Prevent intermixing of soil types or contamination of stockpiled soils.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.03 STOCKPILE CLEANUP

A. Remove stockpile; leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

END OF SECTION 31 05 13

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SECTION 31 05 16
AGGREGATES FOR EARTHWORK

GENERAL

1.01 SUMMARY

A. Section includes:

1. Coarse and fine aggregate materials.
2. Source quality control.
3. Aggregate stockpiling and stockpile cleanup.

B. Related Sections include:

1.02 REFERENCES

A. Reference Standards include:

1. ASTM C33/C33M – Standard Specification for Concrete Aggregates.
2. ASTM C136/C136M – Method for Sieve Analysis of Fine and Coarse Aggregates.
3. AASHTO T 180 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
4. ASTM D2487 – Classification of Soils for Engineering Purposes.
5. ASTM D6938 - Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6. ASTM D4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
7. Standard Specifications for Road and Bridge Construction, Latest Edition, by North Dakota Department of Transportation.

1.03 SUBMITTALS FOR REVIEW

A. See Section 01 33 00 - Submittal Procedures: Procedures for submittals.

B. Samples: Submit, in air-tight containers, 10 pound sample of each type of fill to testing laboratory.

C. Material Source: Submit name of imported material supplier(s). Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

1.04 QUALITY ASSURANCE

A. Section 01 45 00 - Quality Control: Field Samples.

B. Material Source: Submit name of imported material supplier(s). Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PRODUCTS

2.01 COARSE AGGREGATE MATERIALS

A. Coarse Aggregate Type A1: Well graded crushed stone or gravel conforming to the requirements of ASTM C33/C33M, Gradation 67.

B. Coarse Aggregate Type A2 (Aggregate Surface): Gravel; Angular crushed or natural stone; free of shale, clay, friable material and debris; graded in accordance with North Dakota Department of Transportation referenced specifications, Section 816, Class 13.

C. Coarse Aggregate Type A3 (Aggregate Base): Gravel; Angular crushed or natural stone; free of shale, clay, friable material and debris; graded in accordance with North Dakota Department of Transportation referenced specifications, Section 816, Class 5.

D. Coarse Aggregate A4 (Drainage Fill): Uniform, poorly graded natural or crushed stone meeting the gradation requirements of the ND DOT specification section 816, Class 2.

2.02 FINE AGGREGATE MATERIALS

A. Fine Aggregate Type A5 (Sand): Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C33/C33M; within the following limits:

Sieve Size	Percent Passing
3/8-in.	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10

2.03 SOURCE QUALITY CONTROL

A. Section 01 45 00 - Quality Control: Testing and analysis of soil material.

B. Testing and Analysis of Coarse Aggregate Material: Perform in accordance with ASTM C136/C136M, ASTM D2487, AASHTO T 180, and ASTM D6938.

C. Testing and Analysis of Fine Aggregate Material: Perform in accordance with ASTM C136/C136M, ASTM D2487, AASHTO T 180, and ASTM D6938.

D. If tests indicate materials do not meet specified requirements, change material and retest.

E. Provide materials of each type from same source throughout the Work.

EXECUTION

3.01 STOCKPILING

A. Stockpile materials in an area acceptable to Owner.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Prevent intermixing of soil types or contamination of stockpiled soils.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.02 STOCKPILE CLEANUP

A. Remove stockpile; leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

END OF SECTION 31 05 16

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SECTION 31 11 00
CLEARING AND GRUBBING

GENERAL

1.01 SUMMARY

A. Section includes:

1. Protection of features not designated for removal.
2. Removal of trees designated for removal.
3. Topsoil removal in accordance with Section 31 14 13.
4. Disposal of waste materials.

B. Related Sections include:

1.02 REGULATORY REQUIREMENTS

A. Conform to applicable codes and regulations for proper disposal of debris.

B. Conform to applicable codes for worker safety.

PRODUCTS

2.01 MATERIALS AND OWNERSHIP

A. Topsoil: Refer to Section 31 14 13 - Soil Stripping and Stockpiling.

B. Materials such as trees, vegetation, debris, trash and all other material identified by the Owner as unsuitable shall become Contractor's property and shall be removed from the site to a disposal area furnished by the Contractor that is acceptable to local authorities and regulatory agencies. Burning of unsuitable material shall not be allowed on Owner's property.

EXECUTION

3.01 PREPARATION

A. Prior to site clearing, obtain sufficiently detailed photographs or videotape of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Provide, erect, and maintain adequate barriers, fences, and signs.

C. Verify that existing plant life designated to remain is tagged or identified.

D. Beginning work of this Section means acceptance of existing conditions.

E. Identify and furnish an area for storing or placing removed material prior to the commencement of Work in this Section.

F. Conform to all applicable regulations for proper disposal of debris.

3.02 PROTECTION

A. Locate, identify, and protect utilities that are not designated for removal from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping.

C. Protect bench marks, survey control points, and existing structures from damage.

D. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades and from flooding site and surrounding area.

E. Contractor shall repair or replace, to original condition or better, existing structures and improvements, trees, shrubs, and landscaping damaged or injured during construction operations. Contractor shall understand the sensitive nature of working on or near developed property and shall endeavor to limit injury or damage both inside the limits of construction and outside the limits of construction.

F. Protect existing trees and other vegetation indicated to remain from unnecessary cutting, breaking, skinning of roots, skinning and bruising of bark, smothering of trees, by stockpiling construction materials or excavated materials within the drip line, excess foot of vehicular traffic, or parking of vehicles within drip line.

G. Protect wetlands, rivers, streams, and other waters of the state from all construction activities and contamination by erosion and runoff.

H. Protect areas that have been finish graded from subsequent construction operations, traffic, and erosion. Remove, provide new, and compact as required, material contaminated by erosion and runoff

I. Confine Work effort to within Construction Limits shown on the Drawings. Leave undisturbed all appurtenances not indicated for removal or renovation.

3.03 CLEARING

A. Clear areas required for access to site and execution of Work. Stay within easement and right-of-way at all times without prior written approval from property owner and Engineer.

B. Contractor shall make all reasonable efforts to reduce destruction of crops and commodities.

C. Contractor shall be responsible for all permanent tree removal. Remove only the trees and shrubs indicated in Drawings or as directed by Owner or Engineer. Remove stumps, main root ball, and root system to a depth of 48 inches.

D. Remove plant growth and features only if designated to be removed by Owner or Engineer. Clear undergrowth and deadwood, without disturbing subsoil.

3.04 GRUBBING

A. Depressions resulting from grubbing operations shall be backfilled in accordance with other sections in Division 31.

END OF SECTION 31 11 00

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SECTION 31 14 13
SOIL STRIPPING AND STOCKPILING

GENERAL

1.01 SUMMARY

A. Section includes:

1. Protection of features not designated for removal.
2. Topsoil Removal.
3. Stockpiling of Materials.
4. Stockpile Cleanup.

B. Related Sections include:

1.02 DESCRIPTION

A. Excavation shall not be allowed outside of the limits of construction easement.

B. Materials may be temporarily stockpiled on the site within the limits of construction or where shown on the Drawings.

C. Protect benchmarks and existing structures that are to remain from damage or displacement.

1.03 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

1.04 DEFINITIONS

A. Soil Testing Laboratory: Refers to a professional soils engineering firm with soil sampling and testing services that is independent from the Contractor.

B. Structures: Existing and new construction, including slabs, buildings, footings, tanks, and other structural elements.

1.05 SITE CONDITIONS

A. Contractor shall determine to Contractor’s own satisfaction the nature and location of subsurface obstacles and the nature of soil and water conditions which will be encountered during the work.

B. Contractor may perform test borings or other exploratory operations at Contractor’s own expense. Contractor shall make arrangements for any soils investigation with Owner.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 INSPECTION

A. Contractor shall verify which native materials are suitable for reuse at the site. Provide testing data as required and keep materials separated.

B. Notify Engineer of any unsuitable materials.

3.02 PROTECTION OF FEATURES NOT DESIGNATED FOR REMOVAL

A. Protect all existing structures, trees, plantings, turf, and other facilities that are not scheduled or directed for removal.

3.03 TOPSOIL REMOVAL FOR STRUCTURES

A. Remove sod and grass and then excavate full depth of topsoil from areas to be further excavated, re-landscaped, or re-graded without mixing with foreign materials.

B. All topsoil shall be stripped to full depth (12 inches minimum) and stockpiled separately in area of site designated by Construction Manager. Topsoil will be available for replacement on top of finished grading and all disturbed areas not covered by structures or pavement.

C. Separate all debris, large roots, and rocks greater than one (1) inch from the topsoil and remove from the site to Contractor furnished off-site disposal area.

D. Do not excavate wet topsoil.

E. Where trees are to be left standing, stop topsoil stripping a sufficient distance (at least the drip line) from a tree to prevent damage to main root system.

F. Excavated topsoil shall remain on Owner's property. Remove all excavated topsoil to on site stockpile area designated by Construction Manager and stockpile to a depth not exceeding 8 feet and protect from erosion.

3.04 TOPSOIL EXCAVATION – PIPELINE INSTALLATION

A. Strip existing topsoil full depth or a maximum of 12 inches.

B. If installation of pipeline by

1. Trencher method: topsoil must be stripped a minimum width of 12 feet, excavated subsoil material may not be placed on non-stripped top soil.
2. Excavator method: topsoil must be stripped a minimum width of 12 feet, and excavated subsoil material may not be placed on non-stripped topsoil, but must be placed on stripped surfaces.
3. Plow method: no topsoil stripping is required unless subcutting is performed. If Subcutting is performed topsoil must be stripped a minimum

width of 12 feet, and excavated subsoil material may not be placed on non-stripped topsoil, but must be placed on stripped surfaces.

C. Do not excavate wet topsoil. Wet topsoil is defined as wetter than the plastic limit.

D. Stockpile in area on site to depth not exceeding 8 feet and protect from erosion.

E. Remove excess topsoil not intended for reuse from site to a new location acceptable to Owner.

3.05 STOCKPILING OF MATERIALS

A. Contractor may temporarily stockpile acceptable materials including topsoil, excess excavated material, and delivered materials within the limits of construction easement. Excess subsoil material shall be stockpiled on subsoil where topsoil has been stripped. Contractor shall obtain approval from Engineer before stockpiling excess materials.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing. Prevent intermixing of material types or contamination of stockpiled materials.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

E. Apply appropriate erosion control measures to stockpile areas.

F. Contractor shall remove all excess stockpiles from the site prior to substantial completion of the project.

3.06 STOCKPILE CLEANUP

A. Remove stockpile; leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

C. Restore stockpile area in accordance with Section 32 97 00 - Restoration of Disturbed Areas and 32 92 19 - Seeding.

END OF SECTION 31 14 13

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SECTION 31 23 16
EXCAVATION

GENERAL

1.01 SUMMARY

A. Section includes:

1. Preparation.
2. Excavation for pipeline trenches and related appurtenances.
3. Excavation for pipe boring pits, site structures, and utilities.
4. Field quality control.
5. Protection.

B. Related Section include, but are not limited to:

1.02 GENERAL REQUIREMENTS

A. With reference to the terms and conditions of the construction standards for excavations set forth in the Occupational Safety and Health Authority (OSHA) “Safety and Health Regulations for Construction”, Chapter XVII of Title 29 CFR 1926, employ a competent person and, when necessary, a registered professional engineer, to act upon all pertinent matters of the Work of this section.

B. Excavations shall provide adequate working space and clearances for the Work to be performed therein and for installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings.

C. Subgrade surfaces shall be clean and free of loose material of any kind when pipelines and appurtenances are placed thereon.

D. Verify that survey benchmarks, control points, pipeline alignment stakes, and intended elevations for the Work are as indicated on the Drawings.

E. Verify Work associated with lower elevation pipelines and/or utilities is complete before placing higher elevation pipelines or utilities.

F. Rock issues in areas of the pipeline construction may be prevalent in the subsurface and/or on the surface. Contractor is responsible for removal of the rocks in the staked route and in the pipe trench.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 PREPARATION

A. Locate, identify, support, and protect above and below ground utilities that are to remain from damage.

B. Notify and coordinate with all utility owners for location of buried utilities per State and local utility locate requirements prior to performing any excavation activities. Contractor shall be responsible for all utility locate inquiries and shall be responsible for all damages to utilities due to lack of locate inquiry and coordination.

C. Identify required pipeline routes, lines, levels, contours, and datum locations.

D. Identify and protect plant life, lawns, and other features to remain during construction or as a component of final landscaping.

E. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating and construction equipment and vehicular traffic.

F. Cut out soft areas of subgrade not capable of compaction in-place or suitable for pipeline or appurtenance installation. Backfill with Type S1 or S2 fill, as outlined in Section 31 05 13 - Soils for Earthwork, and compact to density equal to or greater than requirements for subsequent backfill material.

3.02 EXCAVATING

A. Excavate and stockpile topsoil in accordance with Section 31 14 13 - Soil Stripping and Stockpiling.

B. Excavate subsoil required for installation of pipelines and appurtenances to required trench depths and widths.

C. When using hydraulic excavators for pipeline installation, excavate trenches sufficiently wide to enable safe pipeline and appurtenance installation and allow safe inspection.

D. Excavate subsoil to accommodate pipeline boring operations, manholes, site structures, construction operations, and other Work.

E. Slope excavation walls with hydraulic excavator per OSHA excavation and access requirements for given soil type. If shoring is proposed for excavation(s), design, install, operate, and maintain shoring system per OSHA shoring and access requirements. Contractor shall be responsible for all shoring system design requirements.

F. Stockpile excavated material in an area on site a suitable distance from excavation to not adversely affect stability of excavation wall(s) and to prevent slides and cave-ins. Refer to Section 31 14 13 - Soil Stripping and Stockpiling for additional stockpiling requirements.

G. Control groundwater within excavations per requirements of Section 31 23 19 - Dewatering.

H. Remove lumped subsoil larger than 3-inches in any dimension, boulders, and rock up larger than 2-inches in any dimension. These subsoil conditions are not

allowed for fill or backfill of the pipeline trench.

I. Grade top perimeter of excavation to prevent surface water from draining into excavation. Water shall not be permitted to accumulate in the excavation.

J. Do not excavate materials that interfere with 45 degree bearing splay of foundations or roadways.

K. Underpin adjacent structures and/or roadways that may be damaged by excavating Work.

L. Hand trim excavations to protect workers below as required. Remove loose matter.

M. Support and protect existing utilities within excavation limits intended to remain in service.

N. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume Work.

O. Compact disturbed load bearing soil in direct contact with Work to original bearing capacity; perform compaction in accordance with Section 31 23 23 - Fill and Backfill.

P. Remove excess or unsuitable material from Site. Bear all costs for removal, hauling, and/or spreading of excess fill.

Q. Backfill and compact excavated and over-excavated areas in accordance with Section 31 23 23 - Fill and Backfill and 32 90 00 - Landscape Grading.

3.03 FIELD QUALITY CONTROL

A. Provide for visual inspection of bearing surfaces.

B. Submit for Engineer's approval prior to construction, information on Contractor proposed grade control method and equipment including, but not limited to, equipment operation, accuracy, and capabilities to record and verify Grade Control.

1. Pipeline installation shall be installed with a maximum horizontal tolerance of +/- 10.00’ for open-cut and bored pipeline.

C. Provide testing services per the requirements of Section 01 45 00 - Quality Control.

D. Provide backfill and soil compaction testing per Section 31 23 23 - Fill and Backfill.

3.04 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations, adjacent soils, and stockpiled soils intended for backfilling operations from freezing.

C. Comply with all OSHA requirements.

END OF SECTION 31 23 16

SECTION 31 23 19
DEWATERING

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Provision and maintenance of an adequate dewatering system to remove and dispose of all surface and groundwater entering the excavation, trenches, and other parts of the Work.

B. Related Sections:

1.02 PERMITS AND LICENSES

A. The Contractor shall be responsible for obtaining all necessary permits as related to dewatering and water discharge and to comply with all stipulations of such permits.

PRODUCTS

2.01 NOT USED.

EXECUTION

3.01 GENERAL

A. Each excavation shall be kept dry during the course of all work herein, including subgrade preparation, pipe installation, and backfilling, to the extent that no damage from hydrostatic pressure, flotation, or other damage results. All excavations shall be dewatered to a depth of at least two (2) foot below the bottom of the exposed surface, the concrete base, or pipe to be installed herein.

B. The Contractor may use any method or combination of methods for dewatering, provided that those methods are consistent with all other provisions contained in the Specifications; however, all dewatering methods and equipment, which, in the opinion of the Engineer, are ineffective at either dewater the site or treating dewatering discharge, shall be abandoned, improved, replaced or otherwise altered to obtain effective dewatering.

C. The Contractor shall provide all power, pumps, materials, and equipment necessary, and shall be responsible for disposing of the water pumped from the excavation in a manner, which will not interfere with other Work within the area and will not damage public or private property. The Contractor will be held responsible for the condition of any pipe, conduit, ditch, channel or natural watercourse utilized for drainage purposes. All erosion, sediment or other adverse results of its use shall be repaired at Contractor's expense.

D. Contractor shall provide suitable means of standby power to keep dewatering system fully operational.

E. All costs for dewatering shall be incidental to the Project and be borne by the Contractor.

3.02 CORRECTIVE ACTION

A. The Contractor shall be responsible for, and shall repair without cost to the Owner, any damage to work in place, other contractors' equipment, and the excavation, or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

B. Contractor shall install appropriate best management erosion control measures and maintain them as required.

3.03 WATER QUALITY CONTROL

A. All points of concentrated dewatering discharge shall be visually inspected daily by the Contractor to determine that any sediment draining out of the construction site is consistent with all applicable permits and regulations.

3.04 REMOVAL

A. Prior to removal of the system, insure compliance with regulatory permits.

B. All wells shall be plugged in accordance with all applicable regulations.

C. Shut off dewatering system at such a rate to prevent quick upsurge of water, which may weather underlying subgrade or surrounding soil.

END OF SECTION 31 23 19

SECTION 31 23 23
FILL AND BACKFILL

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Scarifying, compacting and shaping the earth subgrade below pavements and structures.
2. Backfilling and compaction for:
   a. Pipeline trenches.
   b. Pipeline bore pits or user connection pits.
   c. Cast-in-place structures and manholes.
   d. Hydrants, valve boxes, and other appurtenances.
   e. Fill under landscaped areas.
   f. Fill under paved areas.
   g. Fill in cultivated areas.
   h. Fill for over-excavation.
3. Backfilling and compaction schedule.

B. Related Sections include, but are not limited to:

1.02 REFERENCES

A. Reference Standards Include:

1. ASTM C136/C136M - Method for Sieve Analysis of Fine and Coarse Aggregates.
2. AASHTO T 180 - Test Methods for Moisture - Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
3. ASTM D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).
4. ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).
5. ASTM D6938 - Test Methods for In-Place Density and Water Content of Soil and Soil - Aggregate in Place by Nuclear Methods (Shallow Depth).
6. Standard Specifications for Road and Bridge Construction, Latest Edition, by North Dakota Department of Transportation.

1.03 QUALITY ASSURANCE

A. Section 01 45 00 - Quality Control: Field Samples.

B. Material Source: Submit name of imported material supplier(s). Provide materials from the same source throughout the Work. Change of source requires Engineer approval.

PRODUCTS

2.01 FILL MATERIALS

A. Topsoil and Subsoil Fills: As specified in Sections 31 05 13 - Soils for Earthwork.

B. Aggregate Fills: As specified in Section 31 05 16 - Aggregates for Earthwork.

2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to approval of the Engineer.

EXECUTION

3.01 EXAMINATION

A. Fill, Backfill, and Subgrade preparation shall apply to all pipe trenches, concrete manholes, concrete slabs, paved and graveled areas, including roads, driveways, parking areas, sidewalks, and ramps.

B. Verify sub-drainage, damp proofing or waterproofing, and insulation installation has been inspected.

C. Verify subgrade preparation consists of a firm and stable subgrade prior to placement of the surface or base course.

D. Verify that below-grade cast-in-place concrete structures have cured to 75 percent of their design compressive strength before placing backfill against walls. Provide additional internal structural support to accommodate differential backfill placement per Engineer requirements.

E. Verify valve blocking, required poly wrap, restraints, couplings, valve boxes, and thrust blocking are in-place, complete, and have been inspected and documented as to location and configuration for record drawing purposes.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Notify utility company to locate utilities.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Remove all subsoil lumps larger than 3-inches in any dimension and rocks larger than 2-inches in any dimension from pipe trench backfill pile and area. These subsoil conditions are not allowed for fill or backfill of the pipe trench.

F. All subgrades below structures shall be cut to the final depth with a smooth-edged backhoe or other equipment that will minimize disturbance to the subgrades.

G. Subgrade shall be prepared by scarifying the upper 12-inches of subgrade soil. Subgrade preparation shall extend deeper than 12-inches if the Engineer determines that additional subgrade preparation is necessary to support construction.

H. Compact subgrade to density requirements for subsequent backfill materials, as specified in this Section.

1. Identify soft spots and remove soft areas of subgrade not capable of compaction in-place. Backfill with Type S1 or Type S2 fill, as specified in Section 31 05 13 - Soils for Earthwork, and compact to density equal to or greater than requirements for subsequent fill material.
2. Contractor shall be responsible for drying the subgrade soil or applying water as may be necessary to obtain the required density. Contractor shall also be responsible for grading the Work area and providing drainage so that accumulating water will drain away from the subgrade.

3.03 BACKFILLING AND COMPACTION

A. Backfill and compact areas to existing contours and elevations with unfrozen materials. Follow natural ground contours in cultivated areas, ditches, and landscaped areas. Make gradual grade changes. Blend slope into level areas.

B. Systematically backfill and compact to allow maximum time for natural settlement. Do not backfill over loose, porous, wet, frozen, or spongy subgrade surfaces.

C. Aggregate Fill: Place and compact materials in equal continuous layer not exceeding 6 inches compacted depth.

D. Soil Fill: Place and compact material in equal continuous layers not exceeding two (2) feet compacted depth.

E. Employ a backfill placement method that does not disturb or damage pipelines, appurtenances, or utilities in trenches, bore pits, or other excavations. This includes, but is not limited to, not burying rocks of 2-inches in any dimension in or on the pipe trench.

F. When backfilling trenches, implement construction methods to prevent floatation of pipe and movement of appurtenances.

G. Maintain optimum moisture content of backfill materials to attain required compaction density. Provide and utilize vibration or special compaction equipment when required.

H. Repair and reestablish original grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations, vehicular traffic, or

weather conditions. See Paragraph 3.04 of this Section and Section 01 45 00 - Quality Control.

I. Remove surplus backfill materials from site. Bear all costs associated with loading and hauling excess fill off site.

J. Leave fill material stockpile areas free of excess fill materials. Contractor shall have the responsibility to load, haul, and spread all excess fill off-site. Scarify former stockpile locations grass areas, place top soil, and seed as required to return area to original or better condition.

3.04 TOLERANCES

A. Finish subgrade or rough graded surfaces shall not deviate by more than +/- 0.20-foot from the required section and grade.

B. Top Surface of Backfill in Ditches, Berms, Lawns, and Roadways: Plus or minus 1 inch from required elevations upon completion of settlement, but not to exceed 3 inches above finished grade prior to settlement.

C. Top Surface of Roadways and Driveways: Plus or minus 1 inch from required elevations upon completion of settlement in roadways and driveways, but not to exceed 3 inches above finished grade prior to settlement.

D. Top Surface of Backfill in Cultivated Areas: Plus or minus 3 inches from required elevations upon completion of settlement, but not to exceed 6 inches above finished grade prior to settlement.

E. Trenches and bore pit areas shall be kept within settlement tolerances through the warranty period. Only top soil shall be used to raise settled trenches and bore pit areas.

F. Finish subgrade or rough graded surfaces shall not deviate by more than 1 inch from the required section and grade.

3.05 FIELD QUALITY CONTROL

A. Section 01 45 00 - Quality Control.

B. Compaction testing will be performed in accordance with ASTM D698, ASTM D1557, and ASTM D6938.

C. If compaction tests indicate Work does not meet specified requirements, remove Work, replace, and retest at no additional cost to Owner.

D. Frequency of Compaction Tests:

1. Tests shall be performed per the schedule included in Paragraph 3.07 of this Section at random locations as directed by the Engineer’s on-site project representative.
2. Testing to be paid for by Contractor.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 50 00 - Temporary Facilities and Controls.

B. Reshape and re-compact fills subjected to vehicular or machine traffic.

3.07 BACKFILLING AND COMPACTION SCHEDULE

A. Backfilling of Pipeline Trenches in Cultivated Areas:

1. Fill Type S1 or S2 per Section 31 05 13 - Soils for Earthwork, from trench bottom to subgrade, compacted to 85 percent of the Standard Proctor Density (ASTM D698).
2. If pipeline trench settlement occurs, Contractor shall correct settlement to tolerances referenced in Paragraph 3.04 of this Section. If persistent settlement occurs, compaction testing is required. Contractor shall bear responsibility for all costs associated with fill, whether on-site or external, related to correction of settlement.
3. Cover with Fill Type S4 (topsoil per Section 31 05 13 - Soils for Earthwork).
4. Grade topsoil and prepare topsoil per Section 32 90 00 - Landscape Grading.

B. Backfilling of Pipeline Trenches in Ditches and Landscaped Areas:

1. Fill Type S1 or S2 per Section 31 05 13 - Soils for Earthwork, from trench bottom to subgrade, compacted to 90 percent of the Standard Proctor Density (ASTM D698).
2. If pipeline trench settlement occurs, Contractor shall correct settlement to tolerances referenced in Paragraph 3.04 of this Section. If persistent settlement occurs, compaction testing is required. Contractor shall bear responsibility for all costs associated with fill, whether on-site or external, related to correction of settlement.
3. Cover with Fill Type S4 (topsoil per Section 31 05 13 - Soils for Earthwork).
4. Grade topsoil and prepare topsoil per Section 32 90 00 - Landscape Grading.

C. Backfilling Under Cast-In-Place and Precast Structures:

1. Fill Type A3 per Section 31 05 16 - Aggregates for Earthwork, to 12 inches thick, compacted to 97 percent of the Standard Proctor Density (ASTM D698) and at +/- 2 percent of optimum water content.
2. Conduct one (1) density test of bedding material near center of structure or manhole.

D. Backfilling for Exterior Side of Cast-In-Place and Precast Structures:

1. Fill Type S1 or S2 per Section 31 05 13 - Soils for Earthwork, to subgrade elevation, each lift compacted to 92 percent of the Standard Proctor Density (ASTM D698) and at +/-2 percent of optimum water content.
2. Conduct one (1) density test per each 4 feet of depth prior to placement of topsoil.

3. Cover with Fill Type S4 (topsoil per Section 31 05 13 - Soils for Earthwork).
4. Grade topsoil and prepare topsoil per Section 32 90 00 - Landscape Grading.

E. Backfilling of Hydrants, Valve Boxes, and Other Appurtenances:

1. Fill Type S1 or S2 per Section 31 05 13 - Soils for Earthwork, from excavation bottom to subgrade, compacted to 90 percent of the Standard Proctor Density (ASTM D698).
2. Conduct one (1) density test per each 4 feet of depth prior to placement of topsoil.
3. Cover with Fill Type S4 (topsoil per Section 31 05 13 - Soils for Earthwork).
4. Grade topsoil and prepare topsoil per Section 32 90 00 - Landscape Grading.

F. Backfilling Under Gravel Roadways and Driveways:

1. Fill Type S1 or S2 per Section 31 05 13 - Soils for Earthwork, from excavation bottom to subgrade, compacted to 95 percent of the Standard Proctor Density (ASTM D698).
2. Conduct one (1) density test per each 200 square feet and each 2 feet of depth.
3. Cover with Coarse Aggregate A2 and A3 per Section 31 05 16 - Aggregates for Earthwork.
4. Grade and prepare Coarse Aggregate per Section 32 15 00 - Aggregate Surfacing.
5. If pipeline trench settlement occurs, Contractor shall correct settlement to tolerances referenced in Paragraph 3.04 of this Section.

END OF SECTION 31 23 23

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

GENERAL

1.01 SUMMARY

A. Prevention of sedimentation of waterways, wetlands, and storm and sanitary sewers due to construction activities.

B. Restoration of areas eroded due to insufficient preventative measures.

C. Related Sections include, but are not limited to:

1.02 REFERENCES

A. ASTM D4355/D4355M – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

B. ASTM D4491– Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

C. ASTM D4533/D4533M – Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

D. ASTM D4632/D4632M – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

E. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile.

F. ASTM D4873/D4873M – Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

G. ASTM D698 – Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).

H. General Permit Authorization to Discharge Storm Water Associated with Construction Activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.

I. North Dakota Department of Transportation (NDDOT) Erosion and Sediment Control Handbook – Latest Edition.

J. North Dakota Department of Health (NDDH) – Division of Water Quality – “A Guide to Temporary Erosion Control Measures” – Latest Edition.

1.03 SUBMITTALS

A. Provide product specification sheets for the following erosion control materials to demonstrate that the Contractor’s proposed products meet the Contract Document requirements:

1. Fabric proposed for silt fence
2. Fabric proposed for inlet protection

3. Inlet protection products, such as storm inlet sediment filters
4. Erosion Control Blanket
5. Gradation tests for Construction Entrance stone material

1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of the North Dakota Department of Environmental Quality Division of Water Quality for erosion and sediment control.

B. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained.

C. Timing: Put preventative measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

D. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.
2. Prevent development of ruts due to equipment and vehicular traffic.
3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

E. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.
2. Prevent tracking of mud onto public roads outside of the site.
3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

F. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventative measures, pump dry and remove deposited sediment after each storm.

G. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

H. Open Water: Prevent standing water that could become stagnant.

I. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

PRODUCTS

2.01 SILT FENCE

A. Geotextile Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:

1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested with ASTM D4751.
2. Permittivity: 0.05 secˆ-1, minimum when tested in accordance with ASTM D4491.
3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
6. Tear Strength: 55 lb-f., minimum when tested in accordance with ASTM D4533/D4533M.
7. Utilize Wire Mesh Reinforcement as directed and shown on Drawings.
8. Color: Manufacturer’s standard.

B. Silt Fence Supports

1. Posts: 5 feet long:
   a. Steel T-section, with minimum mass of 1.26 lb per linear foot

2.02 STORM SEDIMENT FILTER

A. Shall be one of the following.

1. Drop-in Sediment Trap.
   a. Geotextile Fabric unit that inserts into the inlet.
   b. Shall be:
      1) Dandy Sack by Dandy Products, Inc.
      2) Siltsack by ACF Environmental.
      3) or equal.

2.03 CONSTRUCTION ENTRANCE

A. Materials As Shown on Drawings.

B. 3-6 inch Stone

1. Stone/Crushed Concrete shall be angular and shall be comprised of hard, durable mineral materials that have been mechanically processed.
2. Stone/Crushed Concrete gradation shall conform to the following:

SIEVE	PERCENT PASSING (by weight)
6-inch	100
3 1/2-inch	50 - 100
3-inch	10 - 75
2-inch	0 - 10
3/8 inch	0 -1

2.04 SLOPE EROSION PROTECTION SHALL BE ONE OF THE FOLLOWING

A. Erosion Control Blanket.

1. Shall consist of a uniform web of interlocking fibers sandwiched between an attached top and bottom layer of net backing meeting the requirements of Section 856.01 of the North Dakota Department of Transportation Standard Specifications for Construction, 2008 Edition.
2. The netting shall be biodegradable containing sufficient UV stabilization for breakdown to occur within a normal growing season.
3. Staples used to anchor the blankets shall be U-shaped, 11 gauge or heavier steel wire having a span width of 1 inch and a length of 8 inches or more from top to bottom after bending.
4. The erosion control blankets acceptable for use on this project include:
   a. Propex, LLC. – Landlok S2.
   b. North-American Green – SC150BN.
   c. or equal.

B. Bonded Fiber Matrix. (BFM)

1. The fibers shall be composed of 100% wood or wood by-products. A minimum of 25% of the fibers shall average 10.16 mm (0.4 inches) in length and 50% or more shall be retained on a Clark Fiber Classifier 24 mesh screen. Fibers shall be colored with a water soluble, non-toxic dye, to aid in uniform application over the site.
2. The binder shall be a hydro colloid based (guar gum) with added slow-release and agricultural based fertilizers. The binder shall not dissolve or disperse upon rewetting.
3. The BFM slurry shall dry to form a crust approximately 3-6 mm (1/8 to ¼ inches) thick adhering to the soil surface.
4. The moisture content of the matrix shall be 12% +/- 3% by weight.
5. The matrix shall consist of materials that are 100% biodegradable and 100% beneficial to plant life.
6. The installation rate of the BFM shall be 3,500 lbs per acre, minimum.
7. The matrix shall provide 100% continuous coverage and shall have no holes greater than 1 mm in size.
8. The hydrated matrix density shall be approximated by a slump test prior to application.
9. The BFM mulch: water ratio shall be as per the manufacturer recommendations. The minimum BFM mulch to water ratio is 50 lbs. BFM mulch and 100 gallons water. The water rate will vary between 100 gallons and 125 gallons per 50 lbs., depending on which of the products is used.

10. The Bonded Fiber Matrix mulch products acceptable for use on this project include:
    a. HydraCM – Manufactured by Tensar North American Green
    b. EcoAegis – Manufactured by CANFOR.
    c. Soil Guard – Manufactured by Mat, Inc.
    d. ConWed 3000 – Manufactured by ConWed Fibers, Inc.

C. Fiber Roll

1. Fiber rolls shall consist of hay or straw free of noxious weeds, or wood excelsior that has been compressed and stuffed into degradable netting.
2. The roll diameter shall be a minimum of nine (9) inches.
3. All weighted fiber rolls shall contain a weighted core with a minimum weight of eight pounds per foot.

EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

B. The Contractor shall follow all requirements of the current North Dakota Department of Environmental Quality Division of Water Quality regulations.

3.03 SCOPE OF PREVENTATIVE MEASURES

A. Vehicle Tracking Pad at Construction Entrances: Traffic-bearing aggregate surface and metal grate, as shown on Construction Details.

1. Width: As required; 20 feet, minimum.
2. Length: 50 feet, minimum.
3. Provide at each construction entrance from public right-of-way.
4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

B. Natural vegetation shall be retained whenever feasible.

C. Land grading and excavating shall be kept at a minimum to reduce the possibility of creating runoff and erosion problems which require extensive control measures.

D. Land exposure shall be minimized in terms of area and time.

E. Silt Fence.

1. Provide along the perimeter edge of soil stockpiles located on the Owner's property.
2. Provide at locations shown on the Plans.

F. Storm Sediment Filters.

1. Place immediately after new storm sewer inlets are installed and immediately before land is disturbed adjacent to existing storm sewer inlets or as directed by Engineer.

G. Slope Erosion Protection.

1. Place at locations shown in the Plans or as directed by Engineer.

H. Fiber Roll

1. Place at locations shown in the Plans or as directed by Engineer.

3.04 INSTALLATION

A. Vehicle Tracking Pad.

1. The rock area shall be a minimum of 6 inches deep, extend the full width of the ingress/egress area and be at least 50 ft long; however, longer entrances may be required to adequately clean tires.
2. Geotextile fabric may be used to prevent migration of mud from the underlying soil into the rock.
3. Metal grate, as shown in Construction Details

B. Storm Sediment Filters.

1. Drop-in Sediment Trap.
   a. Place as recommended by the manufacturer.

C. Slope Erosion Protection.

1. Bonded Fiber Matrix (BFM).
   a. The Contractor shall install the BFM as per the manufacturer's instructions with the following minimum guidelines:
      1) The BFM shall be applied with hydraulic spray equipment by a manufacturer's certified applicator.
      2) Application shall be done at least 24 hours in advance of projected rainfall to allow the BFM mulch adequate time to dry.
      3) The BFM mulch shall be applied into two stages (one-half rate) with ample time to dewater the first application.
      4) The BFM mulch shall be applied from at least two alternate directions, preferably 90 degrees apart if possible, to ensure all soil faces are covered.
      5) The installation rate of the BFM mulch shall be 3500 lbs per acre, minimum and 100% continuous coverage.
      6) After the BFM mulch is applied and dried for 24 to 48 hours, the Owner's Representative will sample and quantify a portion of the installation to ensure the minimum 3500 lbs per acre has been applied. If it is found that the desired 3500 lbs per acre has not been achieved, the Contractor shall apply an additional amount to equal the desired 3500 lbs per acre within 48 hours of receiving the test results. The Contractor will not be paid extra

mobilization costs for spraying additional material.

2. Erosion Control Blanket.
   a. The Contractor shall install the blanket as per the manufacturer's instructions with the following minimum guidelines:
      1) The Contractor shall roll out or lay the blankets parallel to the direction of water flow.
      2) The blankets shall be spread evenly without stretching and so the fibers are in direct contact with the soil over the entire area.
      3) Adjacent strip edges shall overlap each other at least 4 inches.
      4) Strip ends shall overlap each other at least 7 inches.
      5) All overlaps shall be made with the upgrade strip placed over the down grade strip intervals.
      6) The Contractor shall bury the upgrade end of each blanket strip at least 6 inches in a vertical slot in the soil with the soil being pressed firmly against the embedded blanket.
      7) All joints and outer edges of the blanket shall be stapled at 3 foot intervals or less.
      8) Staples placed at junctures and strip ends shall have a maximum spacing of 16 inches.
      9) Staples shall be placed throughout the blanket at a maximum spacing of 3 feet.
      10) All staples shall be inserted flush with the ground surface.

D. Silt Fences:

1. Store and handle fabric in accordance with ASTM D4873/D4873M.
2. Install with top of fabric at nominal height and embedment indicated on drawings.
3. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
4. Fasten fabric to steel posts using "U" shaped clips.

E. Fiber Roll:

1. Each fiber roll shall be overlapped by 1 foot minimum and tied tightly together, to prevent flow between the fiber roll ends.
2. Fiber rolls shall be trenched and staked according to manufacturer's specifications.
3. Six inch fiber rolls shall be used for sheet flow protection on backslopes and foreslopes.
4. Twelve to twenty inch fiber rolls shall be used in ditch bottoms and in areas where shallow concentrated flow is present.

3.05 MAINTENANCE

A. Inspect preventative measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

1. All inspections and maintenance conducted during construction shall be recorded in writing and retained in accordance with the storm water

permit.

B. All removed tree material shall become the property of the Contractor and shall be disposed of off-site in Contractor furnished disposal area.

C. All stumps and roots shall be removed to a minimum of 3 feet below grade.

D. Backfill excavation with suitable on-site soil materials or engineered fill compacted to a minimum of 95% of Standard Proctor Density, ASTM D698.

E. Silt Fences:

1. Promptly replace fabric that deteriorates unless need for fence has passed.
2. Remove silt deposits that exceed one-third of the height of the fence.
3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff of other causes.

F. Fiber Rolls:

1. Sediment deposits shall be removed when the deposit reaches half the height of the fiber roll or when directed by the Engineer.
2. Fiber rolls shall remain in place until the vegetative cover is restored to 70 percent of the preexisting vegetation.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.

B. Where removal of temporary measures would have exposed soil, shape surface to an acceptance grade and finish to match adjacent ground surfaces.

END OF SECTION 31 25 00

DIVISION 32
EXTERIOR IMPROVEMENTS

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SECTION 32 11 23
AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Aggregate base course.

B. Related Sections include, but are not limited to:

1. Section 01 45 00 – Quality Control.
2. Section 31 05 13 – Soils for Earthwork.
3. Section 31 05 16 – Aggregates for Earthwork.
4. Section 31 23 23 – Fill and Backfill.
5. Section 31 23 30 – Trenching.
6. Section 32 05 50 – Restoration of Disturbed Areas.
7. Section 32 90 00 – Landscape Grading.
8. Section 32 97 00 – Restoration of Disturbed Areas.

1.02 REFERENCES

A. Reference Standards include, but are not limited to:

1. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Rammer and 12-inch Drop.
2. ASTM D2167 – Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
3. ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
4. ASTM D3017 – Test Methods for Moisture Content of Soil and Soil-Aggregate in place by Nuclear Methods (Shallow Depth).

1.03 SUBMITTALS FOR REVIEW

A. Section 01 30 00 – Submittals: Procedures for Submittals.

B. Samples: Submit, in air-tight containers, 40 lb. Sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of imported materials supplier(s). Provide materials from same source throughout the Work. Change of source requires Engineers approval.

D. Laboratory Results: Submit in accordance with Section 01 30 00.

PART 2 PRODUCTS

2.01 MATERIALS

A. Surface Coarse Aggregate Type A2: As specified in Section 31 05 16.

B. Base Coarse Aggregate Type A3: As specified in Section 31 05 16.

C. Drainage Coarse Aggregate Type A4: As specified in Section 31 05 16.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify subsoil has been inspected; gradients and elevations are correct.

B. Verify subsoil is compacted to specified density and that subgrade test results have been submitted prior to placing aggregate course.

C. Verify subgrade is dry.

3.02 PREPARATION

A. Correct irregularities in subsoil gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

C. Place aggregate in maximum 6-inch layers and compact to specified density. When aggregate is placed on geotextile fabric, place a minimum of 8-inch depth before operating equipment over fabric.

D. Level and contour surfaces to elevations and gradients indicated.

E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

G. Flatness: Maximum variation of ¼ inch measured with 10-foot straight edge.

H. Scheduled Compacted Thickness: Within ½ inch.

I. Variation from Design Elevation: Within ½ inch.

J. See Section 01 45 00 - Quality Control and Section 31 23 23 - Fill and Backfill for compaction and subsoil requirements and testing.

K. Compaction testing shall be performed in accordance with ASTM D698 and ASTM D2922.

L. Contractor shall perform one compaction tests for each 2000 square feet.

M. If, during progress of Work, tests indicate that compacted materials do not meet specified requirements, remove defective Work, replace, and retest. Contractor to bear all costs associated with defective pavement Work.

N. Base Course under Trench: As specified in Section 31 23 23.

O. Base Course under Sidewalk: Minimum thickness of 6 inches, or as indicated in typical sections, of Type A3 aggregate base per Section 31 05 16. Level and compact base course to 98 percent of maximum ASTM D698 dry density.

P. Base Course under Concrete or Bituminous Pavement: Minimum compacted thickness, as indicated in typical sections, of Type A3 aggregate base per Section 31 15 16. Level and compact base course to 98 percent of maximum ASTM D698 dry density in 6-inch lifts. When geotextile is used, place entire depth in one lift.

Q. Temporary Traffic Aggregate: Crushed Recycled Concrete or Stone aggregate base per section 31 25 00. Thickness as specified in bid documents or 6-inch minimum if not specified otherwise.

END OF SECTION 32 11 23

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SECTION 32 12 16
BITUMINOUS PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. The construction of one or more pavement courses of bituminous-aggregate mixture on the approved prepared foundation, base course, or existing surface in accordance with the specifications and in conformity with the lines, grades, and thicknesses and typical cross sections shown on the plans or established by the Engineer.
2. Tack coat

B. Related Work:

1. Section 01 33 00 - Submittal Procedures.
2. Section 01 45 00 - Quality Control.
3. Section 01 50 00 - Temporary Facilities and Controls.
4. Section 32 97 00 - Restoration of Disturbed Areas.

1.02 REFERENCES

A. ASTM D3665 – Standard Practice for Random Sampling of Construction Materials.

B. ASTM D4791 – Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

C. ASTM D5821 – Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.

D. The Asphalt Institute – SP-2 Superpave Mix Design Manual

E. The Asphalt Institute – AI MS-2 MS-2 Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.

F. The Asphalt Institute – MS-3 Asphalt Plant Manual.

G. The Asphalt Institute – MS-8 Asphalt Paving Manual.

H. The Asphalt Institute – MS-19 Basic Asphalt Emulsion Manual.

I. North Dakota Department of Transportation (NDDOT) Standard Specifications for Road Construction and Bridge Construction, Latest Edition.

J. AASHTO M320 (ASTM D 6373)– Standard Specification for Performance-Graded Asphalt Binder.

K. AASHTO MP2 (TAI SP-2) – Specification for Superpave Volumetric Mix Design.

L. AASHTO T96 (ASTM C 131) – Standard Method of Test for Resistance to Degradation of Small- Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

M. AASHTO T104 (ASTM C 88) – Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.

N. AASHTO T166 (ASTM D2726) – Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens.

O. AASHTO TP4 (ASTM 6925) – Standard Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor.

P. AASHTO T176 (ASTM D2419) – Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.

Q. AASHTO T304 (ASTM C 1252) – Standard Method of Test for Uncompacted Void Content of Fine Aggregate.

1.03 SUBMITTALS FOR REVIEW

A. Section 01 33 00 – Submittal Procedures.

B. Product Data: Furnish materials properties data on aggregates, asphalt cement, bituminous mixtures, asphalt binder, and other materials required for the mix in accordance with Sections 01 33 00 and 01 45 00 at least 7 days prior to beginning paving operations. Engineer must approve job mix formula prior to its use on Project.

1.04 PERFORMANCE REQUIREMENTS AND QUALITY ASSURANCE

A. When referenced, perform Work in accordance with the North Dakota Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

B. Obtain all materials from same source throughout project unless approved by the Engineer.

C. Paving: Designed for H20 classification.

D. Mixing Plant and Mixing Plant Operations: Conform to the North Dakota Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, and The Asphalt Institute (TAI) MS-3 Asphalt Plant Manual.

E. Paved surfaces shall be warranted against any materials and/or workmanship defects for a period of twelve months from placement.

F. The mix design and development of the Job Mix Formula shall be generated by a laboratory

1. accredited by the AASHTO Materials Reference Laboratory (AMRL) at the contractor’s expense.

G. For tack coat, ensure a sufficient bond between the surface being paved over and the overlying asphaltic course being placed.

1.05 REGULATORY AND ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when ambient air temperature (in the shade and away from artificial heat) or base surface temperature is less than 40 degrees F or when surface is wet, dirty, or frozen.

B. No work will be permitted in the spring until the frost has disappeared and the subgrade is stable so as to support the equipment without rutting, shoving, pumping, or other displacement.

C. Conform to applicable code for paving work on public property.

D. Minimize interference with traffic.

E. Conform to the North Dakota Department of Health Clean Air Standards and Stormwater Runoff Standards.

F. Allow minimum of 1 month between completion of crack sealing and paving operation to allow seal to cure. The crack sealing should be accomplished with a recessed configuration if paving is to proceed in the same season.

G. Dispose of all waste material or reject material by approved methods.

H. Conform to the Manufacturer's Material Safety Data Sheet (MSDS) for storage and handling of

1. emulsion products.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Protect the general public from coming in contact with sprayed oil.

B. Do not spray asphalt tack coat if weather conditions call for rain before the emulsion can cure.

PART 2 PRODUCTS

2.01 GENERAL

A. Asphalt Cement: Asphalt cement shall be performance graded asphalt cement meeting the requirements of AASHTO MP1 and as shown on the plans. Asphalt cement for most construction shall be PG 58-28.

B. Aggregate for Mix: The aggregate mix shall be in accordance with section 430.03.B of the NDDOT Standard Specifications for ROAD AND BRIDGE CONSTRUCTION, 2014 EDITION.

2.02 TACK COAT

A. SS1H or CSS1H Emulsion meeting the appropriate requirements of ASTM for the specific grade of emulsion. Non-tracking tack products may also be used as approved by the Engineer.

B. Storage and handling of the emulsion should be performed in accordance with MS-19.

C. Application rate shall be as necessary to create strong bond between layers of pavement but shall be not less than 0.10 gallons per square yard of undiluted asphalt.

D. All conventional asphalt emulsions shall be diluted with water at a 50:50 ratio and applied at twice the recommended application rate. Polymer modified and non-tracking emulsions shall not be diluted. Dilution of the emulsion product should be performed at the emulsion terminal or in a tank at the asphalt plant. Emulsions should not be diluted in the distributor at the project site.

E. Do not allow asphalt emulsion to freeze.

2.03 MIX DESIGN

A. Contractor shall develop the Superpave FAA41 asphalt mixture in accordance with section 430 of the

1. NDDOT Standard Specifications for Road and Bridge Construction, 2014 Edition, to meet the requirements of this Specification. Prior to the production of any Superpave asphalt mixture, submit the proposed mix design with supporting test data indicating compliance with all Superpave mix design criteria. The Contractor shall utilize an AMRL accredited testing firm for the development of the mix design, testing for the performance of the asphalt cement, gradation of the aggregate mix, and requirements of the L.A. Abrasion. The Engineer shall approve the job mix formula submitted by the Contractor.

B. Traffic Levels: The type of bituminous mixture for this project shall be designed based on the traffic level of less than one (1) Million Equivalent Single Axle Loads (ESALs).

C. Layer Thickness: The lift thickness shall be three times the nominal maximum size of the aggregate.

PART 3 EXECUTION

3.01 INSPECTION

A. For new construction, reconstruction, or full depth repair, verify that compacted subgrade is dry, stable, compacted to specified density, and to proper elevations and grade slopes. Ensure base coarse meets the requirements specified in section 32 11 23 Aggregate Base Course. Do not begin asphalt-paving construction without Engineer’s authorization.

B. For overlay and wear course construction, verify that the existing bituminous mat is clean, dry, stable, at proper temperature, and to proper elevations and grade slopes. Do not begin asphalt-paving construction without Engineer’s authorization.

C. Each course shall be compacted and cooled to such a degree that it will not be displaced or otherwise damaged before another course may be placed thereon.

D. Verify the provisions of Section 01 45 00 have been satisfied.

3.02 PREPARATION

A. Notify Engineer and Owner at least 72 hours in advance of temporary disruptions of traffic along route of construction.

B. Saw cut and tack all joints between new and existing pavement. All vertical faces shall have two coats of tack applied.

C. An asphalt tack coat shall be applied to existing asphalt and concrete surfaces, and to the surface of each course or lift constructed, except for the final course or lift in accordance with this Section.

D. All vertical faces shall have 2 applications of tack coat prior to paving. This includes, but is not limited to, curb and gutter faces and all longitudinal bituminous seams.

3.03 ASPHALT PAVEMENT CONSTRUCTION

A. All mixtures shall be spread and finished with a self-propelled, bituminous paver, to the required grade and cross section, leaving the mixture uniformly dense, smooth, and free from irregularities.

B. The speed of the bituminous paver shall be controlled to place the mixture uniformly and

1. continuously without tearing or gouging. The speed shall not exceed the Manufacturer’s recommendation and shall be coordinated with the output of the plant to provide for a smooth, continuous operation, minimizing starting and stopping.

C. Compact pavement by rolling to specified density as follows:

1. Compaction shall consist of initial or breakdown rolling, intermediate rolling, and final or finish rolling with rollers meeting all requirements of NDDOT Standards Specifications Section 151.01 and which are approved by the Engineer.
2. Breakdown rolling shall consist of one or more complete coverages with a vibratory steel wheel roller or a rubber-tired roller.
3. Breakdown rolling shall be followed by intermediate rolling with either a rubber-tired roller or a vibratory steel wheel roller and shall be continued until the surface is tightly bound and shows no displacement under the roller.
4. Intermediate rolling shall be completed before the mat temperature falls below 185 degrees F.
5. Final rolling shall be performed with a static steel wheel roller and shall continue until roller marks are eliminated. Contractor may be required to modify rolling sequence to best suit the construction conditions.
6. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

D. Uniformly blend pavement surface into elevations at curbs, valve box castings, and other critical points of contact. Place pavement so that the pavement is 3/8 inches higher than the edge of the structure after the pavement has been compacted.

E. Do not allow drainage to be impeded or casting covers to become difficult to remove.

F. All transverse and longitudinal joints, high or low areas, and surface irregularities, shall be leveled, filled, or raked prior to compaction. Any loose material dropped on previously compacted lanes shall be removed immediately.

G. Ensure joints made during paving operations are straight, clean, vertical, and free of broken or loose material. Joints shall be tacked and constructed with adequate bond on abutting surfaces. Construction joints in successive courses shall be placed so that joints do not fall on the same vertical plane.

H. The sequence of rolling operations and the selection of type and number of rollers shall be commensurate with production, and shall be adequate to obtain the specified density before the mat temperature falls below 185 degrees F.

I. Install all bituminous pavement 3.5-inches and greater in thickness in a minimum of two lifts. Maximum thickness of a base course lift shall be 3.0-inches.

J. Ensure surface of completed asphalt pavement is true to lines, profiles, and elevations indicated and matches existing grade.

K. The surfaces of previously placed layers shall be swept, and a tack coat applied before spreading the next layer.

L. The overall thickness shown on the Drawings shall be the minimum finished, in-place, compacted thickness of bituminous pavement.

M. Bituminous pavement installation is prohibited when ambient air temperature is consistently below 40 degrees Fahrenheit.

N. Protect newly paved surfaces from traffic and mechanical damage until surface has cooled to

1. 140-degrees Fahrenheit.

O. Any low or high defective areas shall be corrected immediately at the contractor’s expense. Corrective Work shall include patching, cutting out the surface and replacing with fresh, bituminous mixture, or by milling the surface.

P. Clean up paving area.

Q. Ensure manhole covers are clean of all asphalt material and tack coat and returned to the condition they were prior to asphalt paving activities.

3.04 TACK APPLICATION EQUIPMENT

A. Tack distributor shall be designed, equipped, maintained, and operated so that tack material is applied at the specified rate per square yard with uniform pressure over the required width application.

B. The distributor shall be equipped with an onboard computer that determines the relationship between the distributor travel speed and pump speed to ensure a consistent application rate.

C. An accurate and calibrated thermometer with a range covering the specified application temperature for tack material shall be mounted at approximately center height of the tank with the stem extending into the tack material.

D. The distributor shall have a full circulating system with a spray bar, adjustable laterally and vertically. The spray bar shall be maintained at a constant height above the pavement under variable load conditions.

E. The distributor shall have full circulation spray bars with lateral and vertical adjustments.

F. Ensure that all nozzles are of the same size and type to ensure uniform application of emulsion.

G. Ensure that all nozzles are at the same angle to ensure uniform application of emulsion.

H. The distributor shall be checked and calibrated. A certificate of the calibration shall be posted in the driver’s compartment stating that the distributing system is in good working condition and when used with the charts and instructions furnished by the manufacturer will give the required results. The certificate shall bear the date of calibration and signature of the calibrating agency.

I. Use pumps with proper clearances for handling to avoid binding and seizing. Avoid repeated pump cycling or frequent pumping.

J. DO NOT mix different classes, grades, or types of emulsified asphalt in storage tanks, transports or distributors. Make sure tanks are totally clean before changing to another class, grade, or type.

K. Pump from bottom of tank.

L. Do not overheat asphalt emulsion.

3.05 APPLICATION OF TACK COAT

A. Maintain proper distributor spray bar height and spray nozzle angle for proper coverage.

B. Maintain proper distributor speed.

C. Sweep and clean surfaces to be tack coated prior to application. Provide motorized brooms with a positive means of controlling vertical pressure and with

the capability to clean the road surface prior to spraying the bituminous material.

D. Do not apply more tack coating than can be covered by the same day's operation. Perform operations only during daylight hours and not during foggy weather.

E. Do not apply tack coating or fog seal when ambient air temperature is consistently below 40 degrees Fahrenheit or when surface is wet.

F. Do not over-spread tack coating. If "fat spots" develop, spread out excess emulsion by pneumatic tire rolling before placing pavement.

G. Allow enough time for tack coat to "break" before placing pavement.

H. Apply tack coat as directed in Section 401 of the North Dakota Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition and NAPA's Best Practices for Emulsion Tack Coats. Hand spray wands and crack-sealing buckets are not acceptable methods of applying tack coat emulsion except on the vertical face of an adjoining lift of pavement.

I. Apply bituminous tack coat to existing bituminous pavement and to the surface of each lift or course constructed, other than the final course. Apply in a uniform rate with no missed areas permitted.

J. The bituminous tack coat shall be applied at a uniform rate of not less than:

1. gallons per square yard, for undiluted asphalt emulsion (as supplied from the emulsion terminal); application rate shall be adjusted if necessary, to attain bond between courses.
2. gallons per square yard, for diluted asphalt emulsion (with water added at the terminal or plant emulsion tank).

K. The temperature of emulsion shall be between 70- and 160-degrees F at the time of application.

L. Apply immediately prior to the placement of the next bituminous course or lift. Do not allow public traffic on tack coated areas. The tack coat shall be applied in a manner that offers the least inconvenience to traveling public.

M. Apply the tack coat on the same day as the proposed surfacing is to be performed. Where emulsified asphalt is specified, dilute one part of water to one part of emulsion and apply the mixture at two times the undiluted rate of application. Allow water to evaporate completely before beginning paving operations. At request of Contractor, Engineer may approve a change in the dilution ratio of the water-emulsion mixture. Sampling and Testing of the emulsion product shall be done at the discretion of the Engineer.

N. Demonstrate a uniform application of asphalt emulsion producing 100 percent coverage of the surface after curing, as approved by the Engineer. Stop operations if the application demonstration does not meet the coverage requirements.

O. Contractor shall continuously check Tack Coat application rates to make necessary changes to those rates in order to make sure that the diluted emulsion absorbs into the pavement. Contractor to perform a yield check at the beginning of each project. Engineer may require additional yield checks if the application rate is questioned.

P. Do not allow traffic on the tacked surface until after the bituminous material has set and will not pick up on vehicle tires.

3.06 PROCESS CONTROL

A. Section 01 45 00 – Quality Control: Field inspection and testing.

B. Perform field and laboratory testing by an independent testing laboratory appointed and paid for by the Contractor.

C. At the start of mix production, samples of all aggregate stockpiles shall be randomly collected for each aggregate used in the production mixture. The production aggregates shall be tested for the consensus properties and gradations presented in Section 2.01 and shall conform to the JMF tolerances. Any change in aggregate source will not be allowed without written notification of the Engineer and the submittal of a new JMF.

D. Notify testing laboratory to perform density tests when testing is to be performed during construction.

E. If, during progress of Work, tests indicate that compacted materials do not meet specified requirements, remove defective Work, replace, and retest. Contractor to bear all costs associated with defective pavement Work.

F. Perform gradation analysis of aggregate once per day as construction progresses or as required by the Engineer.

G. Perform voids in mineral aggregate (VMA) analysis in accordance NDDOT Specifications; minimum frequency of one test per day as construction progresses.

3.07 TOLERANCES

A. Flatness: Maximum variation of 3/16 inch measured with 10-foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch of specified thickness.

C. Variation from true elevation: Within ½ inch.

D. Transverse slope of surface course shall not vary from the slope shown on plans.

E. Asphalt cement content within 0.5 percent of approved mix design as determined by asphalt ignition testing.

3.08 SCHEDULE

A. BITUMINOUS PAVEMENT:

1. Incidental to project. Repair any bituminous pavement damaged by construction activities. Minimum compacted thickness to match existing.

END OF SECTION 32 12 16

SECTION 32 15 00
AGGREGATE SURFACING

GENERAL

1.01 SUMMARY

A. Section includes:

1. Aggregate surfacing, grading, and compacting.

B. Related Sections include, but are not limited to:

1. Section 01 22 00 – Unit Price Measurement and Payment.
2. Section 01 45 00 – Quality Control.
3. Section 31 05 16 – Aggregate for Earthwork.
4. Section 31 23 32 – Fill and Backfill.
5. Section 32 90 00 – Landscape Grading.
6. Section 32 97 00 Restoration of Disturbed Areas.

1.02 REFERENCES

A. Reference Standards include, but are not limited to:

1. ASTM C136/C136M – Method for Sieve Analysis of Fine and Coarse Aggregates.
2. AASHTO T 180 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
3. ASTM D6938 - Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
4. Standard Specifications for Road and Bridge Construction, Latest Edition, by North Dakota Department of Transportation.

PRODUCTS

2.01 MATERIALS

A. Surface Coarse Aggregate Type A2: As specified in Section 31 05 16.

B. Base Coarse Aggregate Type A3: As specified in Section 31 05 16.

C. Drainage Coarse Aggregate Type A4: As specified in Section 31 05 16.

EXECUTION

3.01 EXAMINATION

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

B. Verify structure and trench backfilling have been inspected.

C. Verify subgrade base has been contoured and compacted.

3.02 SUBGRADE PREPARATION

A. Subgrade Preparation and fill below paved and landscaped areas:

1. Fill Type S1 or S2 as specified in Section 31 05 13, compacted to 95% of Standard Proctor maximum dry density (ASTM D698), and within +/- 3% of optimum moisture content.
2. Lifts shall be no thicker than 6-inches prior to compaction. In the top 24-inches, lifts shall be no thicker than 6-inches.

B. Eliminate uneven areas and low spots.

C. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finish surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

D. Rough grade areas adjacent to structure lines to drain away from structures and to prevent ponding or increase in soil lateral pressure on the structure.

E. Correct irregularities in substrate gradient and elevation by scarifying a minimum of 6 inches, reshaping, and re-compacting.

F. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 AGGREGATE PLACEMENT

A. Spread aggregate over prepared subgrade as required to meet the requirement of each circumstance as outlined in Section 32 11 23 - Aggregate Base Course.

B. Place aggregate in maximum 3-inch layers and compact to specified density.

C. Level and contour surfaces to elevations and gradients to existing conditions or indicated on Drawings.

D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

E. Add water to assist compaction as necessary. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

G. Contractor shall provide the degree of finish grading that will be normally obtainable through the use of suitable equipment operated under favorable conditions and by an experienced operator. Deviations from the required tolerance shall be corrected by the Contractor at no additional cost to the Owner.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1 inch measured with 10-foot straight edge.

B. Scheduled Compacted Thickness: Within ¼-inch.

C. Variation from Design Elevation: The finished surface shall not vary from the prescribed cross section or original elevation by more than ½-inch.

3.05 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with AASHTO T 180 and ASTM D6938.

B. Gradation testing will be performed by performing sieve analysis in accordance with ASTM C136/C136M.

C. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest at no additional cost to Owner.

D. Frequency of Tests:

1. Gradation Testing: One test for every stockpile of material.
2. Compaction Testing: As specified in Section 01 45 00 – Quality Control and Section 31 23 23 - Fill and Back Fill.

END OF SECTION 32 15 00

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SECTION 32 90 00
LANDSCAPE GRADING

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Topsoil Placement.
2. Finish Grading of Topsoil.

B. Related Sections

1. Section 01 22 00 – Unit Price Measurement and Payment.
2. Section 01 45 00 – Quality Control.
3. Section 31 05 13 – Soil for Earthwork.
4. Section 31 05 16 – Aggregates for Earthwork.
5. Section 31 11 00 – Clearing and Grubbing.
6. Section 31 14 13 – Soil Stripping and Stockpiling.
7. Section 31 23 23 – Fill and Backfill
8. Section 32 92 19 – Seeding.
9. Section 32 97 00 – Restoration of Disturbed Area.
10. Section 33 31 01 - Manholes and Structures.
11. Section 33 10 00 - Water Utilities.

1.02 REFERENCES

A. Reference Standards include:

1. ASTM D6938 - Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
2. ASTM D698 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).

PRODUCTS

2.01 MATERIAL

A. Topsoil: Fill Type S4 as specified in Section 31 05 13.

B. Subsoil: Fill Type S1 or S2 as specified in Section 31 05 13.

C. Provide source testing data in accordance with Section 01 45 00.

EXECUTION

3.01 EXAMINATION

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

B. Verify structure and trench backfilling have been inspected.

C. Verify substrate base has been contoured and compacted.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Remove debris, roots, branches, and stones in excess of 2 inches in size. Remove subsoil contaminated with petroleum products.

C. Contractor shall be responsible for coordinating with all utility companies for location of buried utilities prior to excavation. Locate, identify, and protect all utilities that remain, from damage.

D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

E. Protect benchmarks, survey control points, and existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

F. Provide proper erosion and sediment control for all grading operation.

3.03 ROUGH GRADING

A. Subgrade Preparation and fill below paved and landscaped areas:

1. Fill Type S1 or S2 as specified in Section 31 05 13, compacted to 95% of Standard Proctor maximum dry density (ASTM D698), and within +/- 3% of optimum moisture content.
2. Lifts shall be no thicker than 9-inches prior to compaction. In the top 24-inches, lifts shall be no thicker than 6-inches.

B. Eliminate uneven areas and low spots.

C. Scarify subsoil surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

D. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finish surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

E. Rough grade areas adjacent to structure lines to drain away from structures and to prevent ponding or increase in soil lateral pressure on the structure.

3.04 FINISH GRADING

A. Contractor shall provide the degree of finish grading that will be normally obtainable through the use of suitable equipment operated under favorable conditions and by an experienced operator. Deviations from the required tolerance shall be corrected by the Contractor at no additional cost to the Owner.

3.05 PLACING TOPSOIL

A. Place topsoil in areas where seeding and restoration is required to a nominal depth of 6 inches. Place topsoil during dry weather.

B. Use imported topsoil in urban areas as a supplement to excavated topsoil only when a 6 inch depth is unable to be maintained.

C. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.

D. Remove roots, weeds, rocks, and foreign material while spreading.

E. Manually spread topsoil close to plant life and buildings to prevent damage.

F. Lightly compact placed topsoil.

G. Drag topsoiled areas to remove wheel tracks and provide a uniform texture and appearance

H. Remove surplus subsoil and topsoil from site. Contractor shall pay for loading, hauling, and spreading of all excess topsoil materials removed from the site or placed and spread on-site by direction of Owner or Engineer.

I. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.06 TOLERANCES

A. As specified in Section 31 23 23 – Fill and Backfill.

3.07 PROTECTION

A. Protect landscaping and other features remaining as final Work.

B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

END OF SECTION 32 90 00

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SECTION 32 92 19
SEEDING

GENERAL

1.01 SUMMARY

A. Section includes:

1. Seeding of all areas disturbed during construction.

B. Related Section include:

1. Section 01 22 00 – Unit Price Measurement and Payment.
2. Section 01 31 13 – Project Coordination.
3. Section 01 33 00 – Submittal Procedures
4. Section 01 45 00 – Quality Control.
5. Section 31 05 13 – Soils For Earthwork.
6. Section 31 11 00 - Clearing and Grubbing
7. Section 31 14 13 – Soil Stripping and Stockpiling.
8. Section 32 90 00 – Landscape Grading.
9. Section 32 97 00 – Restoration of Disturbed Areas.

1.02 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Leafy Spurge, and Perennial Sorrel.

1.03 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.04 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers, open or damaged packaging is not acceptable.

1.06 COORDINATION

A. Coordinate work under provisions of Section 01 31 13.

PRODUCTS

2.01 MATERIALS

A. Seed shall be furnished in labeled, standard containers. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. All seed shall be endophyte enhanced unless noted. The pure live grass seed mixture to be used shall be as follows:

1. Type I - used for residential yards
2. Type II - used for commercial green spaces and reservoir sites
3. Type III - used for ditches/legal drains
4. Type IV - used for CRP, Grassland Easement, Forest Service Land, and WPA Areas, contact local NRCS for seed mixture and variety
5. Type V - used for alfalfa crop areas
6. Type VI - used as noted on plans and as noted here:

Types in pounds of live seed per acre					
	Type I	Type II	Type III	Type IV	Type V
Perennial Ryegrass	50	50			
Park Kentucky Bluegrass	50	75			
Durahard Fescue	30	10			
Tall Wheat Grass				10	
Intermediate Wheatgrass			12.5	5	
Bromegrass (Lincoln)			27.5		
Alfalfa				2	
Sweet Clover				1	
Legendary Varity by Cenex					12
Oats (temp)			10		
Total lbs.	130	135	50.0*	18	12
Fertilizer Type	5-10-5	5-10-5	20-20-20	20-20-2	5-10-5
Fertilizer Application Rate	50	50	50	**	**
*Additional 2 lbs per acre of Canary Reed shall be used if the bottom of the channel shall be seeded.					
**Apply moisture, fertilizer, and mulch, at the Contractor's discretion, to provide the proper environment for seed germination and sustained growth.					

B. Seed tags shall be provided with each bag of seed used on the project and shall be given to the engineer. Certifications shall be provided with each bag of seed used on the project. Certifications shall be provided upon request. Labels (seed tags) for seed shall contain the following:

1. Name and address of supplier
2. Lot Number
3. Origin for each kind of seed
4. Purity percentage and germination for each kind of seed
5. Date of last test
6. Pounds of bulk seed and pure live seed for each type of seed and for total mix in each bag.

C. Fertilizer – Fertilizer shall be a commercial product; partly derived from organic sources and a nitrogen-phosphorous-potassium combination as shown in the schedule above. Fertilizer shall be free flowing and suitable for application with mechanical equipment, delivered in sealed containers, each fully used and bearing the name, trade-name or trademark and warranty of producer.

D. Vegetative Mulch (Type A) - Vegetative mulch shall be composed of straw only. Straw shall be harvested stalks of oats, wheat, barley, or rye. 50% of which shall be 10 inches long or longer. Material shall be sufficiently moist to prevent anchoring without breaking. Mulch shall be applied at a rate of 2 tons per acre. This is to be utilized at contractors discretion.

E. Hydro-Mulch (Type B) – The mulch shall be uniformly applied at a rate of one ton per acre and shall cover the entire seedbed area up to 95%. The mulch shall permit the percolation of water to the underlying soil. The mulching shall consist of a wood cellulose fiber (strands) that has not been treated with any germination or growth inhibitive substances. The mulch shall be treated with a tackifier to enhance mulch placement and adherence to the soil. The mulch shall contain no foreign matter or noxious substances or seeds that would be detrimental to seed growth. No sawdust byproduct mulch will be allowed. This is to be utilized at contractors discretion.

F. Topsoil – If new topsoil is specified, it shall be essentially free of subsoil, organic debris, objects larger than two (2) inches in diameter, substances harmful to plant growth and any other material detrimental to grading, seeding or sodding, and maintenance operations. It shall be of the sandy loam type unless otherwise specified.

EXECUTION

3.01 INSTALLATION

A. Preparation of Seedbed –

1. All debris, vegetation, and stones larger than 2 inches in diameter shall be removed from the site. Ground surfaces shall conform to plan grades.

The ground shall then be tilled to a depth of 4 inches, the surface after which shall be free from lumps and irregularities. If perennial weeds of any kind are present before tilling, they shall be controlled by the application of a pre-emergence herbicide at least 2 weeks before seeding. Two applications shall be required. This shall not be allowed, however, within 200 feet of streams, rivers, legal drains, or wetlands.

2. Prepare topsoil for seeding by cultivating and raking as recommended by seed supplier. Remove soil lumps or debris larger than 3 inches.

B. Planting Seed –

1. Seeding shall be done between the dates of April 15th and June 1st or September 1st and October 1st. Any planting done between the dates of June 1st and September 1st shall be done so with permission in writing only and then only by the addition of 10 pounds of oats per acre to the specified amount of seed. The addition of oats shall be at the contractor's expense. Dormant fall seeding will be allowed with approval from the Engineer. Typical times of dormant seeding are from late October to early November with the soil temperatures reach less than 50 degrees F. Consult the North Dakota Agricultural Weather Network website for soil temperatures.
2. Apply seed and companion crop evenly and in two (2) intersecting directions (where applicable). Seed shall be sown by uniformly drilling with a brillion-type seeder. Rake or harrow in lightly.
3. Uniformly distribute over areas to be seeded using a press drill with depth control bands and grass seed attachment. If furrow spacing exceeds 9 inches, drill seeded area twice.
4. Drill cross slope.
5. Provide packer wheels to firm soil over seed.
6. Plant to a depth of 1/4 to 1/2 inch.
7. Seed spoil areas, disturbed areas on site and along project pipeline routes previously grass covered, and all other areas within the Project site areas devoid of vegetation or that have unsuitable vegetation as a result of construction activities. Seed haul roads and other disturbed areas outside the Project limits and/or easements.
8. Do not sow immediately following rain, when ground is too dry, or during winds that are strong enough (as determined by the engineer – usually above 15 mph) to prevent it from being properly embedded in the surface.
9. Perform seeding after grading of seedbed surfaces has been completed.

C. Straw Mulching – The area shall be raked or dragged after seed placement to the satisfaction of the engineer before mulch placement. The mulch shall be placed within 24 hours after the seeding has been completed. This operation shall not be done in high winds that prevent the mulch from being properly placed. Mulch that contains excessive moisture shall not be used if it prevents uniform feeding through machine. Bales shall be broken up and loosened as they are fed into blower to avoid placement of matted or unbroken lumps. The mulch shall be machine blown and shall be uniformly spread over seeded areas. Excessive cover shall be avoided. Punching or asphalt shall anchor mulch.

1. Punching – Mulch shall be punched immediately after application into soil using a mulch tiller consisting of a series of dull, flat disks with notched or cutout edges. The disks shall be approximately 20 inches in diameter, ¼ inch thick, spaced approximately 8 inches apart, and shall be fitted with scrapers. The tiller shall be operated on contour, except on slopes steeper than 3:1 where diagonal operations are required using a tractor with dual drive wheels or crawler tread on the tractor to minimize sideslip and rutting slopes. Tiller members shall be able to push the mulch into the soil 3 inches with ends of the mulch exposed above the soil surface.
2. Asphalt – Emulsion shall be applied with mulch or by spraying surface immediately after mulching. Emulsion shall be applied at a rate between 225 and 275 gallons per acre. All structures and miscellaneous items shall be protected from being marked or splattered.

D. Reseeding and Repair - Any area in which the seed does not take, or in which erosion has occurred shall be repaired and reseeded until the desired result is obtained. If erosion is prevalent, utilize Hydro-Mulch as defined in Part 2.01 of this section.

E. Water - Water for seed is not available on site. The contractor shall water areas seeded as necessary to achieve the required growth. This shall be considered incidental to this item. Watering the seed shall be done by the contractor for a period of 8 weeks after seed has been sown.

F. Fertilizer - Fertilizer placement shall be done prior to seeding. For any seeding type specified, the fertilized area shall be thoroughly watered 24-48 hours after fertilizing.

G. Topsoil - Salvaging and reusing existing topsoil will be required unless a separate bid item is included in the bid schedule or other items are stipulated in the plans or Measurement & Payment section of the specifications. Topsoil shall be spread on all areas to be seeded.

3.02 FIELD QUALITY CONTROL

A. It shall be the contractor's responsibility to insure that the seed grows adequately (which is defined as attaining a seeded grass growth of 15 plants (seedlings) per square foot for all seeded areas.)

B. Reseed non-compliance areas until proper growth is attained.

C. Control growth of weeds. Apply herbicides in accordance with manufacturer’s instructions. Remedy damage resulting from improper use of herbicides.

END OF SECTION 32 92 19

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SECTION 32 97 00
RESTORATION OF DISTURBED AREAS

GENERAL

1.01 SUMMARY

A. Section includes:

1. Restoration of all areas disturbed during construction.
2. Restoration of all items not specifically identified for restoration, but damaged through construction.

B. Related Sections include, but are not limited to:

1. Section 01 77 00 – Contract Closeout.
2. Section 31 11 00 – Clearing and Grubbing.
3. Section 31 05 13 – Soils for Earthwork.
4. Section 31 05 16 – Aggregate for Earthwork.
5. Section 31 23 16 – Excavation.
6. Section 31 23 23 – Fill and Backfill.
7. Section 31 25 00 – Erosion and Sedimentation Control.
8. Section 32 15 00 – Aggregate Surfacing.
9. Section 32 90 00 – Landscape Grading.
10. Section 32 92 19 – Seeding.
11. Section 33 10 00 – Water Utilities.

PRODUCTS

2.01 MATERIALS

A. Material Sections include:

1. Topsoil and Subsoil: As specified in Section 31 05 13.
2. Aggregate Materials: As specified in Section 31 05 16.
3. Seed: As specified in Section 32 92 19.

EXECUTION

3.01 EXECUTION

A. Observe all surface features requiring protection, removal and replacement, and/or restoration prior to construction.

B. The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land monuments and property marks until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.

C. The Contractor shall be responsible for all damage or injury to property of any character during the prosecution of the Work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the Work, or at any time due to defective Work or materials, and said responsibility will not be

released until the Project shall have been completed and accepted.

D. When any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to the condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding, or otherwise restoring as may be directed or he shall make good such damage or injury in an acceptable manner.

3.02 RESTORATION

A. Restore all areas disturbed by construction to a condition equal to or better than existed prior to construction.

B. Replace, restore, repair, or otherwise make good any damage done to any tree, bush, or shrub that is not specifically designated for removal.

C. Restore items such as culverts, road signs, power poles, sodding, fences, driveways, mailboxes, and like, whether or not specifically identified on the drawings, to a condition equal to or better than existed before construction. Fences that have been temporarily repaired shall be marked with signage reading “TEMPORARY FIX” until a permanent repair has been made to the fence. Contractor is responsible for reliability of all fencing until Project has been granted final completion.

D. Replace or repair all concrete or asphalt driveways, concrete sidewalks, and curb and gutter removed or damaged during construction with equal or better materials. Replace or repair to match existing conditions.

E. Stabilize subgrade sufficiently to prevent mixing of granular material with subgrade prior to application of base material.

F. Place topsoil per Section 31 05 13 and seed areas disturbed by construction in grassed areas per Section 32 92 19.

G. Prior to re-opening any section to full public access, all sidewalks, driveways, curb ramps, and curb and gutter shall be installed.

H. All damage to streets, driveways, berms, etc. due to the Contractor’s construction techniques and equipment shall be repaired at the Contractor’s expense prior to final payment.

I. Remove all excess dirt, concrete, and other debris from project site immediately upon completion of Work. Contractor shall be required to clean site to the condition prior to the start of construction before final payment will be made.

END OF SECTION 32 97 00

DIVISION 33
UTILITIES

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SECTION 33 01 10
DISINFECTION OF WATER UTILITY DISTRIBUTION SYSTEM

RESERVOIR GENERAL

1.01 SUMMARY

A. Section Includes:

1. Disinfection of water system.
2. Testing and reporting results.

B. Related Sections:

1. Section 01 33 00 – Submittals Procedures.
2. Section 01 61 00 – Common Product Requirements.
3. Section 01 77 00 – Closeout Procedures.
4. Section 33 10 00 – Water Utilities.

1.02 REFERENCES

A. AWWA B300 - Standard for Hypochlorites.

B. AWWA B301 - Standard for Liquid Chlorine.

C. AWWA C651 - Standards for Disinfecting Water Mains.

D. AWWA C652 - Disinfection of Water-Storage Facilities.

E. Federal Specifications BB-C-12a, O-C-114a, and O-S-602b.

1.03 DEFINITIONS

A. Disinfectant Residual means the quantity of disinfectant in treated water.

B. PPM means parts per million.

1.04 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 - Submittals Procedures: Procedures for submittals.

B. Test Reports: Indicate results comparative to specified requirements.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01 33 00 and Section 01 77 00.

B. Disinfection Report:

1. Date issued.
2. Project name and location.
3. Contractor’s name, address, and phone number.
4. Type and form of disinfectant used.
5. Date and time of disinfectant injection start and time of completion.
6. Test locations.
7. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
8. Date and time of flushing start and completion.

9. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.

1.06 QUALITY ASSURANCE

A. Regulatory Agency Requirements: Comply with North Dakota Department of Health requirements and AWWA C651.

B. Testing Firm: Company specializing in testing potable water systems, certified by the North Dakota Department of Health.

C. Submit bacteriologist's signature and authority associated with testing.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect against damage and contamination.

B. Maintain caution labels on hazardous materials.

C. Maintain storage room dry and with temperatures as uniform as possible between 60 and 80 degrees F.

D. Provide necessary signs, barricades, and notices to prevent any person from accidentally consuming water or disturbing system being treated.

PRODUCTS

2.01 DISINFECTION CHEMICALS

A. AWWA B300, Hypochlorite: Shall conform to Federal Specification O-C-114a, Type II, Grade B, or Federal Specification O-C-602b.

B. AWWA B301, Liquid Chlorine: Shall conform to Federal Specification BB-C-120a.

EXECUTION

3.01 PREPARATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Notify General Contractor about defects needing correction.

C. Do not start Work until conditions are satisfactory.

D. Select one form of chlorine for use in disinfection.

E. Flush mains thoroughly before introduction of chlorinating material. Maintain flushing velocity in main of not less than 2.5 feet per second unless the Engineer determines that conditions do not permit the required flow to be discharged to waste.

3.02 DISINFECTION OF WATER PIPING SYSTEMS

A. Use of calcium hypochlorite granules for use on solvent welded plastic or on screwed joint steel pipe is prohibited because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

B. Perform disinfecting in accordance with AWWA C651 prior to start-up. Coordinate with other Contractors, Engineer, and Owner.

C. Inject treatment disinfectant into piping system to obtain 50 to 80 ppm residual for period of 24 hours or inject minimum 200 ppm slug with two (2) hours of contact time.

D. Provide and attach required equipment to perform the work of this Section. Disinfectant material shall be introduced into the water system in a manner approved by the Engineer.

E. Test for disinfectant residual at each of the following locations:

1. End of piping runs.
2. Or where directed by Engineer

F. All valves in the mains being disinfected shall be opened and closed several times during the contact period.

G. All water supply and distribution mains shall be disinfected with chlorine prior to acceptance by the Owner.

H. Flush heavily chlorinated water from main using fresh water from the system until chlorine measurements show that the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system.

I. Dispose of heavily chlorinated water properly. Provide dechlorination equipment and reagents as required.

J. Submit test report to Engineer.

K. Contractor shall pay all testing costs.

3.03 DISINFECTION OF WATER STORAGE FACILITIES

A. Perform disinfecting and testing in accordance with AWWA C652 prior to start-up. Coordinate with other Contractors, Engineer, and Owner.

B. Use of calcium hypochlorite granules for use on solvent welded plastic or on screwed joint steel pipe is prohibited because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

C. Inject treatment disinfectant into storage system to obtain 50 to 80 ppm residual for period of 24 hours

D. Provide and attach required equipment to perform the work of this Section. Disinfectant material shall be introduced into the water system in a manner approved by the Engineer.

E. Test for disinfectant residual at each of the following locations:

1. Each storage facility
2. Or where directed by Engineer

F. All water storage facilities receiving work shall be disinfected with chlorine prior to acceptance by the Owner.

G. Flush heavily chlorinated water from storage facility using fresh water from the system until chlorine measurements show that the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system.

H. Dispose of heavily chlorinated water properly. Provide dechlorination equipment and reagents as required.

I. Submit test report to Engineer.

J. Contractor shall pay all testing costs.

K. After disinfection and flushing, test district treated water for bacteriological contamination as outlined in the following Options:

3.04 BACTERIOLOGICAL TESTING OF PIPELINES

A. After disinfection and flushing, test district treated water for bacteriological contamination as outlined in the following Options:

1. Option A: Before approving a main for release, take an initial set of two samples, and then resample again a minimum of 16 hours later. Both sets of samples must pass for the main to be approved for release. Following sampling site procedures outlined in AWWA C651.
2. Option B: Before approving a main for release, let the main sit for a minimum of 16 hours without any water use. Then collect without flushing the main, two sets of samples a minimum of 15 min apart while the sampling taps are left running. Both sets of samples must pass for the main to be approved for release. Following sampling site procedures outlined in AWWA C651.

B. Bacteriological testing shall be done on each branch greater than one 40-foot pipe length per requirements of AWWA C651.

C. During sampling procedure the samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate.

D. Hoses and fire hydrants are not recommended for sample collection that will be used to make decisions on the bacteriological quality of drinking water.

E. Contractor shall collect all samples, pay for shipping/delivery, and pay all testing costs.

F. Two consecutive test samples per test location indicating bacteriological satisfactory water shall be obtained before pipeline is placed into operation within Owner's system per requirements of AWWA C651.

G. If contamination is shown to be still present in the water sample(s), Contractor shall repeat the disinfection, flushing, and testing procedure.

H. Contractor shall pay all testing costs and shall be responsible for costs related to flushing, disinfecting, and testing until the water samples pass. See Section 01 50 00 Temporary Facilities and Controls for determine the cost for water.

I. Upon receiving water sample test results, submit test report(s) to Engineer.

3.05 BACTERIOLOGICAL TESTING OF WATER STORAGE FACILITIES

A. After disinfection and flushing, test district treated water for bacteriological contamination as outlined in AWWA C652.

END OF SECTION 33 01 10

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SECTION 33 05 07
TRENCHLESS INSTALLATION OF UTILITY PIPE

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Directional boring methods for:
   a. Cased bores.
   b. Directional bores.

B. Related Sections:

1. Section 01 22 00 – Unit Price Measurement and Payment.
2. Section 01 31 13 – Project Coordination.
3. Section 01 33 00 – Submittal Procedures.
4. Section 01 45 00 – Quality Control.
5. Section 01 50 00 – Temporary Facilities and Controls.
6. Section 01 61 00 – Common Product Requirements
7. Section 01 77 00 – Closeout Procedures.
8. Section 31 23 16 – Excavation.
9. Section 31 23 23 – Fill and Backfill.
10. Section 33 01 10 – Disinfection of Water Utility Piping Systems.
11. Section 33 10 00 – Water Utilities.

1.02 REFERENCES

A. Reference Standards include:

1. AASHTO T 180- Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
3. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
4. AWWA C200 – Standard Specifications for Steel Water Pipe 6 Inches and Larger.
5. AWWA C206 – Standard Specifications for Field Welding of Steel Water Pipe.
6. AWWA M11 – Steel Pipe-A Guide for Design and Installation.
7. ASTM A36/A36M – Carbon Structural Steel.
8. ASTM A139/A139M – Electric-Fusion (ARC) – Welded Steel Pipe (NPS 4 and over).
9. ASTM A283/A283M – Low and Intermediate Tensile Strength Carbon Steel Plates.
10. ASTM A572/A572M – High Strength Low-Allow Columbium-Vanadium Structural Steels.

1.03 SUBMITTALS

A. Submit per Section 01 33 00.

B. Product Data: Provide data on pipe, pipe fusion equipment and fusion process, couplers, drilling fluid(s), and accessories.

C. Submit qualifications and history of previous pipeline boring work completed of equivalent nature and scope (diameter, materials, length, and depth). Include qualification and experience of key personnel. Relevant qualifications can be found in Paragraph 1.05 of this Section.

D. Installation Plan: Submit description of proposed construction plan, plan to establish and maintain vertical and horizontal alignment within specified tolerances, plan to maintain borehole stability, and drilling fluid and mud recovery process, as applicable to boring method.

E. Submit for Engineer's approval prior to contruction, information on Contractor proposed grade control equipment including, but not limited to, equipment operation, accuracy, and capabilities to record and verify final grade.

F. Submit emergency response procedures to handle the following situations:

1. Conduit is compromised and jeopardizes integrity of installation or safety.
2. Boring process is interrupted by an obstruction such as a rock/boulder or other debris.
3. Bore hole abandonment process, if necessary.
4. Drilling fluid frack out or other major loss of drilling fluids.

1.04 CLOSEOUT SUBMITTALS

A. Submit per Section 01 33 00 and per Section 01 77 00.

B. Project Record Documents: Record actual bore hole configuration, invert elevations along pipe route, and locations of couplers connecting polyethylene (POLY) pipe to PVC distribution or transmission pipeline at each end of bore, where applicable.

1.05 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this section with minimum five (5) years documented experience.

1. Work Experience: Include projects of similar magnitude and conditions. Include river crossing, railroad, and/or highway boring experience as applicable.
2. Furnish list of references upon request.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Per Section 01 61 00 requirements for transporting, handling, storing, and protecting products.

B. Protect piping from entry of foreign materials and water by temporary covers as sections of Work are completed and as isolated parts of the system are completed until final connections are made.

C. Support carrier pipes with nylon slings during handling; cables, chains, or ropes are not allowed.

D. Protect carrier pipe encasement materials from damage in handling.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable permits issued by governing agencies for installation of the Work of this Section.

B. Contractor is responsible for obtaining a copy of applicable permits from the Engineer and retaining a copy of applicable permits at the bore site throughout the duration of the Work.

C. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

PRODUCTS

2.01 MATERIALS

A. Pipe Materials:

1. Refer to the following sections for pipe materials:
   a. Shall conform to Section 33 10 00 as applicable for.
      1) Railroad cased bores.
      2) Directional bores.

EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Verify that excavation base is ready to receive Work and that excavations, dimensions, and elevations are adequate for proper installation of casing and/or pipelines.

B. Notify and coordinate with all utility owners for location of buried utilities per State and local utility locate requirements prior to performing any boring activities. Contractor shall be responsible for all utility locate inquiries and shall be responsible for all damages to utilities due to lack of locate inquiry and coordination.

C. Verify location and elevation of existing above ground and below ground utilities.

3.02 BORE PITS OR TRENCHES

A. Excavate bore pits or trenches in accordance with Section 31 23 16.

B. Contractor shall observe all OSHA requirements for excavation and trench safety.

3.03 INSTALLATION

A. General:

1. Trenchless installation of utility pipe methods shall be performed where indicated on Drawings or as directed by Engineer.
2. The boring machine shall be operated to prevent either surface heave, drilling fluid frack out, or loss of ground during boring. Drilling head shall be steerable and boring machine shall be capable of controlling the advance of the heading to maintain line and grade within the tolerances specified in the Paragraph 3.06 of this Section entitled “Settlement, Alignment, and Tolerances”.
3. Contractor shall continuously contain and properly dispose of all drilling fluids, drilling mud, and waste materials. Disposal or burial on-site will not be permitted.
4. Polyethylene pipe shall be allowed to set after being installed by directional bore method until such a time that the change in pipe length due to temperature change is minimized. Pipeline end connections shall not be made until temperature change period has been completed.
5. Casing and/or carrier pipe shall be installed by a trenchless boring method appropriate to the application.
6. In areas where limited amount of right-of-way or easement is available, half-lengths of carrier pipe of 10 feet may be used to limit size of bore pit(s).
7. The pipe shall be installed to the lines and grades required to maintain specified elevation for utilities. Provide recommended utility and other clearances as outlined in applicable permits from governing agencies or utility owners.
8. Pipe shall have a minimum of 90 inches of cover to top of pipe from finished grade. In locations of gravel and compacted driveways and parking lots, pipe depths shall be increased to a minimum cover of 96 inches.
9. Use tools and equipment of adequate size and capacity for installing pipe to insure Work will proceed continuously until complete.
10. The use of water as an aid in Cased Borings shall not be allowed.
11. Excavate, sheet, shore, brace, and dewater boring pits as necessary to provide safe work place.
12. Backfilling of boring pits, drilling fluid and mud handling pits, and entrance/exit points shall conform to Section 31 23 23.
13. Use rollers and ballast as recommended by pipeline manufacturer for each method of installation, type of pipe, size of pipe, pressure rating of pipe, and the length of the bore.

B. Railroad, Township, County, and State Road Crossings

1. All easements and/or permits will be obtained by the Owner.
2. The Contractor shall procure all other certificates, insurance, and licenses required by state, county, or local laws, ordinances, or rules, and

regulations regarded to the performance of this Work. Additionally, any law, ordinances, insurance, training, regulations, and rules required by the particular railroad company shall be obtained or adhered to.

3. All railroad, asphalt or concrete highways, upgraded roadways, and streets will be installed via trenchless installation methods as specified and shall not be open cut. Bores will be paid for by one of the following methods:
   a. Directional Bore Installation.
   b. Cased Bore Installation.
   c. Only crossings designated by the Engineer for Directional or Cased Bores will be paid for at the respective unit price. All other bores will be paid as watermain installation by open cut methods.
4. State Highway Crossings
   a. Installed with polyethylene water pipe by trenchless installation methods as specified and shall comply with the regulations of the North Dakota Department of Transportation. The length of highway bores is shown on plans or will be determined by the Engineer's Field Representative as outlined in Section 01 22 00. Contractor may install additional polyethylene water pipe by this method for his convenience in crossing utilities or surface items that would require restoration; however, this pipe shall be paid for at the unit bid price for watermain pipe installation by open cut methods.
   b. Polyethylene Casing Pipe
      1) May be required when crossing North Dakota State Highways; based on the requirements stated on the crossing's issued permit by the North Dakota Department of Transportation.
      2) See Section 33 10 00 for casing pipe requirements.
      3) Install as indicated on Drawings or as directed by Engineer.
   c. Marker signs are required to be placed on both sides of the pipe crossing at the Right-of-Way line on a North Dakota State Highway crossing unless indicated otherwise by Engineer or Owner.
5. County Road Crossings
   a. Installed with polyethylene water pipe by trenchless installation methods as specified and shall comply with the regulations of the corresponding county. The length of highway bores is shown on plans or will be determined by the Engineer's Field Representative as outlined in Section 01 22 00. Contractor may install additional polyethylene water pipe by this method for his convenience in crossing utilities or surface items that would require restoration; however, this pipe shall be paid for at the unit bid price for watermain pipe installation by open cut methods.
   b. Polyethylene Casing Pipe
      1) May be required when crossing county roads; based on the requirements stated on the crossing's issued permit by the corresponding county.
      2) See Section 33 10 00 for casing requirements.

3) Install as indicated on Drawings or as directed by Engineer.

c. Marker signs are required to be placed on both sides of the pipe crossing at the Right-of-Way line on a County Road crossing unless indicated otherwise by Engineer or Owner.

6. Township and Private Road Crossings

a. Installed with polyethylene water pipe by trenchless installation methods as specified and shall comply with the regulations of the corresponding township. The length of the bores is shown on plans or will be determined by the Engineer's Field Representative as outlined in Section 01 22 00. Contractor may install additional polyethylene water pipe by this method for his convenience in crossing utilities or surface items that would require restoration; however, this pipe shall be paid for at the unit bid price for watermain pipe installation by open cut methods.

7. Railroad Crossings

a. All railroad crossings must be steel encased.

1) See Section 33 10 00 for casing requirements.

2) Install as indicated on Drawings or as directed by Engineer.

b. Installed by trenchless installation methods as specified and shall comply with the regulations of the corresponding railroad company. The length of railroad bores is indicated on plans and will be paid for on the basis of lump sum. Contractor may install additional polyethylene water pipe by this method for his convenience in crossing utilities or surface items that would require restoration; however, this pipe shall be paid for at the unit bid price for watermain pipe installation by open cut methods.

C. Stream, Creek, and Wetland Crossings

1. All pipes across streams, creeks, or wetlands shall be made with polyethylene water pipe, and installed by trenchless installation methods as specified. Engineer in the field shall make determination on the location and length of stream, creek, and wetland crossings.
2. For directional boring method of installation, pipe shall be weighted to ensure pipe stability against pressure surges and to counter-act the buoyancy of the empty pipe. Method and type of weights shall be as required by boring contractor for intended pipeline installation.
3. Minimum bury depth shall be 7.5 feet below the stream or creek bottom or any predominantly level wetland.
4. The polyethylene pipe shall extend a minimum of 50 feet beyond the banks of any stream, creek, or wetland.
5. All non-seasonal waterbody crossings such as streams, creeks, and wetland of 15-feet or larger will require metering stations in accordance with the North Dakota Department of Environmental Quality requirements.

D. Utility Crossings

1. Utility Crossings may be installed via trenchless installation methods if requested by Engineer. See Section 33 10 00 for requirements when crossing utilities. The length of the bores is shown on plans or will be

determined by the Engineer's Field Representative as outlined in Section 01 22 00.

3.04 FIELD QUALITY CONTROL

A. General:

1. All Work under the contract shall be done to the lines and grades indicated in the Contract Documents or prescribed by the Engineer within acceptable tolerances. The Contractor shall provide the Engineer with reasonable advanced notice of the times and locations of proposed Work so that lines and grades may be furnished with minimum inconvenience to the Engineer and minimum delay to the Contractor. At the request of the Engineer, the Contractor shall, without charge, provide labor, material, tools, and equipment to temporarily assist the Engineer in determining measurements, surveys, and reference marks.
2. Grade Control shall be performed by the Contractor in accordance with the Contractor's submittal with Engineer approval.
3. It may be necessary at times that portions of the Contractor’s Work be discontinued for brief periods, to allow the Engineer to may make measurements or complete surveys without interruptions or other interference that might impair the accuracy of the results. At any time, on request of the Engineer, the Contractor shall discontinue his Work to accommodate Engineer’s on-site measurement and/or surveying services.
4. No direct payment will be made to the Contractor for Work or delays associated with the establishment or checks of lines, grades, or measurements. No extension of contract time will be allowed for such delays.

B. Field Tests and Inspections:

1. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing and inspections. The Contractor will provide evidence that any item of Work is being or has been constructed in accordance with the Drawings and Specifications.
2. For directional bores, the Contractor shall use a horizontal directional drilling (HDD) tracking system to continuously monitor the line and grade during installation of the carrier pipe to determine any deviations and to provide information required for Record Drawing purposes. The Contractor shall verify the transmitter’s readings prior to the start of the bore.

3.05 SETTLEMENT, ALIGNMENT, AND TOLERANCES

A. Bores and Pipeline Alignment:

1. Settlement or heave of ground surface along centerline of boring alignments during and after installation of pipe shall not exceed one (1) inch.
2. Annulus between bore hole outside diameter and casing or carrier pipe outside diameter, as applicable, shall be 2-inches or less. The annular space created by overcut or reaming shall be filled with bentonite slurry.

3. High points, which allow air to collect in pipelines, will not be permitted unless an air release valve is indicated on the Drawings at that location.
4. Pipelines shall be installed to the general horizontal alignment shown on the Drawings. The Contractor shall correct any deviation in the horizontal alignment that results in the bore(s) colliding with utilities that parallel the proposed pipeline route at no additional cost to the Owner. Corrective measures may include boring a new pipe length in a new location and abandonment and filling of bore hole placed in error. The Contractor must obtain approval from the Owner and Engineer prior to implementation of any corrective measures.
5. Pipelines shall be installed to the horizontal alignment shown on the Drawings or staked in the field with a tolerance of +/- 5.00'. The Contractor shall correct any deviation in the horizontal alignment that results in the bore(s) colliding with utilities that parallel the proposed pipeline route at no additional cost to the Owner. Corrective measures may include boring a new pipe length in a new location and abandonment and filling of bore hole placed in error. The Contractor must obtain approval from the Owner and Engineer prior to implementation of any corrective measures.
6. Pipe alignment shall be straight from one end of the bore to the other with no significant "dog legs" that will adversely affect the performance of the pipe or stress carrier pipe during installation.
7. All costs, losses, and damages associated with defective bore(s) will be paid by the Contractor including, but not limited to, additional engineering time, compensation for removal of defective bore(s) in the future, filling the defective bore(s) with controlled density fill (CDF), damage to structures or property, additional easement and right-of-way costs, and additional pipe and fittings required to correct alignment deviations to connect to PVC or POLY distribution or transmission pipelines.

3.06 BORING METHOD SCHEDULE

A. Cased Boring: Railroad crossing, highway crossings, interstate crossing as indicated on the Drawings, or as directed by Engineer.

B. Directional Boring: As directed by Engineer for gravel and paved roads, water bodies, utilities, or other areas.

END OF SECTION 33 05 07

SECTION 33 10 00
WATER UTILITIES

GENERAL

1.01 SUMMARY

A. Section includes exterior work involving:

1. Polyvinyl chloride (PVC) and polyethylene (HDPE or Poly) pipe and fittings for water lines.
2. Gate valves, service saddles, couplers, flush valves, curb stops, ball valves, and additional valves and appurtenances.
3. Connections to existing pipes.
4. Connections to new pipes.
5. Pipe casing requirements.
6. Bedding materials.
7. Accessories.

B. Related Sections include, but are not limited to:

1. Section 01 22 00 - Unit Price Measurement and Payment.
2. Section 01 25 00 - Substitution Procedures.
3. Section 01 31 13 - Project Coordination.
4. Section 01 31 19 - Project Meetings.
5. Section 01 33 00 - Submittal Procedures.
6. Section 01 45 00 - Quality Control.
7. Section 01 61 00 - Common Product Requirements.
8. Section 01 77 00 - Closeout Procedures.
9. Section 10 14 00 - Signs.
10. Section 31 05 13 - Soils for Earthwork.
11. Section 31 05 16 - Aggregates for Earthwork.
12. Section 31 23 16 - Excavation.
13. Section 31 23 23 - Fill and Backfill.
14. Section 31 25 00 - Erosion and Sedimentation Control.
15. Section 32 90 00 - Landscape Grading.
16. Section 32 97 00 - Restoration of Disturbed Areas.
17. Section 33 01 10 - Disinfection of Water Utility Distribution System.
18. Section 33 05 07 - Trenchless Installation of Utility Pipe.
19. Section 33 31 10 - Manholes and Structures.
20. Division 40 - Process Interconnections.

1.02 REFERENCES

A. Reference Standards include:

1. ASTM A536 – Ductile Iron Castings.
2. ASTM D1248 – Polyethylene Plastics Extrusion Materials for Wire and Cable.
3. ASTM B584 – Standard Specification for Copper Alloy Sand Castings for General Applications

4. ASTM D1599 – Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings.
5. ASTM D1784 – Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated PVC Compounds.
6. ASTM D1785 – Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
7. ASTM D2000 – Rubber Products in Automotive Applications.
8. ASTM D2239 – Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameters.
9. ASTM D2241 – Polyvinyl Chloride (PVC) Pressure-Rated Plastic Pipe (SDR Series).
10. ASTM D2513 – Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings.
11. ASTM D2855 – Two-Step Method of Joining Poly Vinyl Chloride (PVC) or Chlorinated Poly Vinyl Chloride (CPVC) Pipe and Piping Components with Tapered Sockets.
12. ASTM D3035 – Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
13. ASTM D3139 – Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
14. ASTM D3350 – Polyethylene (PE) Plastic Pipe and Fitting Materials.
15. ASTM F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
16. ASTM F714 – Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.
17. ASTM F1055 – Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing.
18. AWWA C104/A21.4 – Cement-Mortar Lining for Ductile Iron Pipe and Fittings.
19. AWWA C105/A21.5 – Polyethylene Encasement for Ductile-Iron Pipe Systems.
20. AWWA C111/A21.11 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
21. AWWA C151/A21.51 – Ductile-Iron Pipe, Centrifugally Cast.
22. AWWA C153/A21.53 – Ductile-Iron Compact Fittings.
23. AWWA C502 – Dry Barrel Fire Hydrants.
24. AWWA C509 – Resilient Seated Gate Valves for Water Supply Service.
25. AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
26. AWWA C700 – Cold-Water Meters - Displacement Type, Metal Alloy Main Case.
27. AWWA C710 – Cold-Water Meters - Displacement Type, Plastic Main Case.
28. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 60 in.
29. AWWA C901 – Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. (19 mm) through 3 In. (76 mm), for Water Service.

30. AWWA C905 – Polyvinyl Chloride (PVC) Pressure Pipe, 14 in. through 48 in., for Water Transmission and Distribution.
31. AWWA C906 – Polyethylene (PE) Pressure Pipe and Fittings, 4 in. through 63 in, for Waterworks.
32. NSF/ANSI 60 – Drinking Water Treatment Chemicals - Health Effects.
33. NSF 61 – Drinking Water System Components - Health Effects.

1.03 SUBMITTALS FOR REVIEW

A. Per Section 01 33 00.

B. Before any materials or equipment are purchased, the Contractor shall submit a complete list of materials and equipment to the Engineer for approval. This information shall include the manufacturer's name and the type, size, rating, and catalog number for each of the following items:

1. Ductile iron pipe and fittings.
2. Gate valves and boxes.
3. Corporation stops.
4. Flush hydrants.
5. Saddles.
6. PVC pipe and fittings.
7. Poly pipe and fittings.
8. Stop boxes.
9. Curb stops.

C. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories.

D. Product Test Reports: The manufacturer of the PVC piping shall furnish an affidavit that all delivered materials comply with the requirements of ASTM D2241.

E. Installation Plan: Submit description of proposed construction plan, plan to establish and maintain vertical and horizontal alignment within specified tolerances, as applicable to open cut, boring, trenching, and plowing methods.

F. Submit for Engineer's approval prior to construction, information on Contractor proposed grade control equipment including, but not limited to, equipment operation, accuracy, and capabilities to record and verify final grade.

1.04 SUBMITTALS AT PROJECT CLOSEOUT

A. Per Section 01 77 00.

B. Record actual locations of piping mains, valves, connections, and thrust restraints.

1.05 MANUFACTURER'S CERTIFICATES AND REPORTS

A. Manufacturer Pipe Certifications

1. Complete Form A from the end of this Specification Section and submit prior to construction beginning. Three (3) copies of Form A shall be

submitted to the Engineer.

2. Form A shall be signed by the pipe manufacturer prior to construction beginning, certifying that the pipe complies with requirements specified in this Section and is suitable for installation based on the proposed bedding and backfilling requirements as specified in Section 31 23 23.
3. Signed certificates are required for approved pipe manufacturers.

B. Material Handling and Installation Certification

1. Signed by the pipe manufacturer.
2. The designated representative of the pipe manufacturer must be an employee of the pipe manufacturer.
3. Completed Form B from the end of this Section shall be submitted prior to or accompany the first pay application request for the pipe installation. Three (3) copies of Form B shall be submitted to the Engineer.
4. Payment for any installed pipe will not be made prior to the Engineer receiving Form B.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with Section 01 45 00.

B. Perform Work in accordance with grade tolerances as indicated in Sections 01 33 00, 01 45 00, 31 23 16, and 33 05 07.

C. Valves: Manufacturer's name and pressure rating marked on valve body.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01 61 00.

B. Deliver and store valves in shipping containers with labeling in place.

1.08 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American NSF/ANSI 60 and NSF 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

PRODUCTS

2.01 WATER PRESSURE PIPE AND FITTINGS

A. Polyvinyl Chloride (PVC) Water Pipe:

1. PVC pipe of 12 inches in diameter and smaller
   a. PVC Pressure Pipe manufactured of PVC resin conforming to ASTM D1784, Type 1, Grade 1 (Class 12454-B). ASTM D2241 with Standard Thermoplastic Dimension Ratio (SDR). All pipe must bear the NSF 61 seal of approval for potable water.
   b. Pressure Classes (unless indicated otherwise on Drawings.):

1) 1.5-inch through 5-inch: SDR-21, Class 200 or SDR-26, Class 160, IPS.
2) 6-inch through 12-inch: SDR-26, Class 160, IPS.

c. Pressure classes pertain to open cut, plow, or trencher installation.

d. Pipe shall be supplied of consistent length with a minimum length of 40 feet.

e. The manufacturer's recommended minimum pipe bending radius shall be at least 600 times the outside diameter of the pipe.

f. The manufacturer of each shipment of pipe is required to supply a statement certifying that each lot or load of pipe has been subjected to the appropriate testing for PVC pipe meeting the requirements of ASTM D2241 or ASTM D1599, as applicable.

g. Joints: ASTM D3139, push-on bell and spigot utilizing gasket sealing system meeting ASTM F477. Gasket sealing system shall be Locked-In Rieber Gasket type joint. Restrain pipe as required.

h. Install pipe in compliance with manufacturer's recommendations and in accordance with ASTM D2241.

i. Approved Manufacturers:
1) Northern Pipe Products
2) J-M Manufacturing Company, Inc.
3) Diamond Plastics Corporation
4) CertainTeed Pipe
5) Approved Equivalent

B. Polyethylene (Poly) Water Pipe:

1. ASTM F714, AWWA C901, AWWA C906, PE4710 bearing the NSF 61 seal of approval for potable water and polyethylene compound with a cell classification of ASTM D3350-PE445574C.

2. Pressure Classes (unless indicated otherwise on Plan Sheets):
a. Open Cut, Plow, or Trencher Installation:
1) Sizes 1.5-inch through 5-inch: DR-11, Class 200, IPS.
2) Sizes 6-inch through 8-inch: DR-13.5, Class 160, IPS, unless otherwise specified.
3) Size 12-inch: DR-17, Class 120, IPS, unless otherwise specified.

b. Directional Bores, and Cased Bores:
1) Sizes 1-inch through 5-inch: DR-11, Class 200, IPS.
2) Sizes 6-inch through 8-inch: DR-13.5, Class 160, IPS.
3) Size 12-inch: DR-17, Class 120, IPS, unless otherwise specified.

c. Miscellaneous 1-inch Service Lead Pipe:
1) Rated for a minimum working pressure of 250 psi, IPS, SDR-7, PE3330.

3. Provide with rigid, high-quality, stainless steel liners or stiffeners for insertion in the ends of Poly pipe for all connections to appurtenances with the use of compression fittings.

4. All poly with nominal diameters of 6-inch and greater shall be supplied of consistent length with a minimum length of 50 feet.

5. All poly with nominal diameters of less then 6-inches shall be supplied as rolled coils with maximum coil length to minimize fused connections.
6. Pipe shall be marked with identifications indicating the size, type, and class rating.
7. Poly pipe joints and joints between plain end Poly pipe and Poly fittings shall be made by butt fusion or electrofusion-type polyethylene couplers (ASTM F1055). The Contractor shall ensure that persons making heat fusion joints have received training in the Manufacturer's recommended procedure.
8. Approved Manufacturers:
    a. CP Chem Polyethylene (Plexco)
    b. Sclair Pipe
    c. Pipeline Plastic
    d. WL Plastics
    e. Centennial Plastics, Inc.
    f. Approved Equivalent

C. Water Main Fittings:

1. All fittings shall be supported by concrete blocks placed under the fitting and directly on top of virgin compacted earth.
2. Couplers, Reducers, and Tees & Bends - 2-inches through 12-inches -
    a. Fittings shall be in accordance with AWWA C110/A21.10 or AWWA C153/A21.53.
    b. All Fittings shall be supported by blocks under fitting to undisturbed subsoil materials.
    c. Fittings shall meet requirement of NSF 61.
    d. Fittings at a minimum shall meet or exceed the pressure classes of the pipe which the fitting is connected, unless specifically indicated on the Drawings.
    e. Fittings shall be cement lined in accordance with AWWA C104/A21.4 with gaskets meeting ASTM F477.
    f. All Metallic buried fittings/appurtenances shall be encased in polyethylene conforming to AWWA C105/A21.5.
    g. Fittings Markings
        1) Meet the minimum requirements of AWWA C151/A21.51.
        2) Minimum Markings shall include:
            (a) "DI" or "Ductile" cast or metal stamped on each fitting
            (b) Applicable AWWA/ANSI standard for that fitting.
            (c) Pressure Rating
            (d) Number of degrees for all bends
            (e) Nominal diameter of the openings
            (f) Year and country fitting was cast
            (g) Manufacturers mark
    h. Joints
        1) Mechanical Joints with Mechanical Restraint.
            (a) Restraint devices shall consist of multiple gripping wedges incorporated with stainless steel bolts and nuts into a follower gland meeting the applicable requirements of AWWA C110/A21.10 or AWWA

C153/A21.53.

(b) The devices shall have the working pressure meeting or exceed the pressure rating of the connecting pipe with a 2:1 Safety Factor.

(c) Restraint devices shall have specific designs for PVC IPS pipe and HDPE IPS pipe.

(d) Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

(e) Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600 while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

(f) Proper actuation of the gripping wedges shall be ensured with torque-limiting twist-off nuts.

(g) PVC Mechanical Joint Restraints

(1) Must be rated for use with PVC SDR 21 IPS pipeline.

(2) Shall be provided with manufacturer applied epoxy coating.

(3) Where approved by Engineer/Owner in writing, utilize push-on mechanical joint restraints/thrust blocking.

(4) Type and Manufacturer: Series 2000 PV by EBBA Iron, Inc., Star Grip Series 4000G2 by Star Pipe Products, or Approved Equal.

(h) Bolt-Thru Mechanical Joint Restraints

(1) Restrain MJ valves and fittings to each other.

(2) Meets the ductile iron and working pressure specifications of AWWA compact fittings; AWWA C153/A21.53 and AWWA C110/A21.10 for water service.

(3) Mechanical joint valves and fittings shall be connected using a bolt-through positive restraint mechanism manufactured of USA ductile iron conforming to ASTM A536, 65-45-12.

(4) The positive restraint device shall connect the valves and/or fittings at a linear distance not to exceed three (3) inches and without attachment to pipe.

(5) The device shall come complete with all accessories, including standard styrene butadiene rubber (SBR) MJ gaskets conforming to the latest revision of AWWA C111/ASTM F-477 and weathering steel (Corten) bolts conforming to AWWA C111/A21.11 and ASTM A242. Nuts for 3

through 12-inch sizes shall be SAE Grade 5 steel with black oxide coating.

(6) Nuts for 14-inch and larger adaptors shall be heavy hex Corten steel conforming to ASTM A242.

(7) For applications requiring stainless steel for underground, the bolts and nuts shall be ASTM A193 type 304 or 316 stainless (as requested) and the nuts shall be Teflon® coated.

(8) Sizes 3-12-inch of the bolt-through MJ positive restraining device shall be supplied with an NSF 61 asphaltic seal coating in accordance with ANSI/AWWA C104/A21.4.

(9) Sizes 14-36-inch shall be supplied with NSF 61, 7-mil. fusion bonded epoxy conforming to AWWA C116/A21.16-09 as well as the coating, surface preparation and application requirements of ANSI/AWWA C550.

(10) The device shall be used with standard mechanical joint fittings (AWWA C110 or C153) and valves.

(11) Type and Manufacturer: Standard Adaptors with Standard Accessories by Infact Corp. Foster Adaptor or approved equivalent.

(12) Type and Manufacturer: Epoxy Adaptors with Blue Fluorocarbon (Teflon) Accessories by Infact Corp. Foster Adaptor or approved equivalent.

(13) Type and Manufacturer: Epoxy Adaptors Stainless Steel Accessories by Infact Corp. Foster Adaptor or approved equivalent.

(i) DIP Mechanical Joint Restraints

(1) Must be rated for use with Ductile Iron Pipe.

(2) Shall be provided with manufacturer applied epoxy coating.

(3) Where approved by Engineer/Owner in writing, utilize push-on mechanical joint restraints/thrust blocking.

(4) Type and Manufacturer: Mega-lug Series 1100 by EBAA Iron, Inc., Star Grip Series 3000 by Star Pipe Products, or Approved Equal.

(j) Steel Pipe Restraints:

(1) Must be rated for use with Steel Pipe.

(2) Shall be provided with manufacturer applied epoxy coating.

(3) Type and Manufacturer: Mega-lug Series 1100 by EBAA Iron, Inc., Star Grip Series 3000 by Star Pipe Products, or Approved Equal.

(k) PVC Mechanical Joint Adapters
(1) Must be rated for use with PVC SDR 21 IPS pipeline.
(2) Shall be provided with manufacturer applied epoxy coating.
(3) Type and Manufacturer: MJ X MJ Adapter by Star Pipe Products, or equal
(4) In lieu of PVC Adapters, a small piece of pipe and two PVC Mechanical Joint Restraints may be used with prior approval from Engineer.
(l) HDPE Mechanical Joint Restraints
(1) Must be rated for use with HDPE SDR 11 IPS pipeline.
(2) Joints between plain end pipes and ductile iron fittings utilize pipe stiffeners and restraints as recommended by Manufacturer.
(3) Shall be provided with manufacturer applied epoxy coating.
(4) Utilize transition gaskets as recommended by manufacturer.
(5) Type and Manufacturer: Series 2000 PV by EBBA Iron, Inc., Star Grip Series 4000G2 by Star Pipe Products, or Approved Equal.

2) Utilize gaskets for each size and pipe type as recommended by manufacturer.

3. Couplers, Reducers, and Tees & Bends Less than 5-inches – May be PVC compound meeting ASTM D1784, Class 200 psig rating. Bell shall be gasketed joint conforming to ASTM 3139 and gaskets meeting ASTM F477.
4. Tees, Bends, and Reducers: Polyethylene, Molded Fittings, ASTM F714, PE4710, IPS, bearing the National Sanitation Foundation (NSF) seal of approval for potable water and polyethylene compound with a cell classification of ASTM D3350-PE445574C. Pressure rating and SDR to match or exceed that of the pipeline. May only be placed directly on to adjacent Poly pipe with butt fusion or electrofusion; to transition to PVC as specified in this specification section. Fabricated fittings may only be utilized with Engineer's approval.
a. Approved Manufacturers:
1) CP Chem Polyethylene (Plexco)
2) Sclair Pipe
3) ISCO
4) WL Plastics
5) Approved Equivalent
5. Connection to PVC Pipeline with tee fittings: 5-foot Poly spool (comprised of stick Poly pipe only) fused to each end or branch of Poly fitting and installation of an 18-inch or 4-foot repair coupler at each PVC connection point (as specified in drawings).

6. Connection to PVC Pipeline with all fittings except tees: 5-foot Poly spool (comprised of stick Poly pipe only) fused to each end or branch of Poly fitting and installation of an 18-inch or 4-foot repair coupler at each PVC connection point (as specified in drawings).
7. Connection to Poly Pipelines: 5-foot Poly spool (comprised of stick Poly pipe only) fused to each end or branch of Poly fitting and butt fused at each Poly connection point or jointed at each Poly connection point with appropriate butt fusion or electrofusion coupler (ASTM F1055).
8. Approved Manufacturers:
    a. CP Chem Polyethylene (Plexco)
    b. Sclair Pipe
    c. ISCO
    d. WL Plastics
    e. Approved Equivalent

D. End Connections for Non-Cased Bores, Directionally Drilled Bores, and Cased Bores:

1. Directionally drilled bores, and cased bores shall comply with the specifications set forth in Section 33 05 07.
2. Carrier pipe shall be POLY as specified in Paragraph 2.01.B.
3. PVC to POLY end-of-bore connections shall be made with 4-foot or 8-foot repair PVC transition couplings as specified in Paragraph 2.02.A.2.
4. POLY to POLY end-of-bore connections shall be made using butt fusion or with appropriate electrofusion coupler (ASTM F1055) as specified in Paragraph 2.02.A.3.

2.02 COUPLINGS

A. Couplings:

1. PVC to PVC:
    a. Method 1: Transition/Repair coupler/coupling to be made with PVC couplers.
        1) Material: PVC; rated for minimum working pressure of 250 psi unless noted otherwise on Drawings.
        2) Length: 18-inches – applicable to distribution and transmission pipeline connections and fitting installations. Refer to Drawings details.
        3) Approved Manufacturers:
            (a) CertainTeed.
            (b) Harco.
            (c) Napco Industries.
            (d) Specified Fittings, LLC.
            (e) Approved Equivalent.
    b. Method 2: Extended Range Restrained Coupler/Coupling
        1) May be installed with prior approval from Engineer.
        2) Material: Shall be manufactured of ductile iron casting, meeting the requirements of ASTM A 536, grade 65-45-12 on all applicable parts, minimum-working pressure rating of 350 psi.

3) Grippers shall be machine sharpened and heat treated. Coated for superior corrosion resistance.
4) Draw hooks shall be of uncoated 304 stainless steel.
5) Coated with a fusion bonded epoxy.
6) Provide encasement in polyethylene conforming to ANSI/AWWA C105/A21.5.
7) Gaskets meeting ASTM D2000 and NSF61.
8) Ramp runners manufactured with black Nylon 66 and 14% glass filled.
9) Bolts and Nuts manufactured R-Blue with 5/8-11 bolts with heavy hex nuts coated to reduce friction and provide corrosion resistance. Washer manufactured of 304 stainless steel.
10) Type and Manufacturer:
(a) Alpha Restrained Coupling by Romac Industries, Inc.
(b) Approved Equivalent.

c. Method 3: Hymax Restrained Coupler/Coupling
1) Where indicated on Drawings and approved prior to installation by Engineer, the following may be utilized: a restrained coupling meeting 232 psi pressure rating; NSF 61 Certified; Stainless Steel Type 304 nuts and bolts, Inlet and Outlet sizes as indicated on Drawings. Manufacturer: Hymax Grip Coupling by Mueller or equal.

2. PVC to POLY – Directional Bores and Cased Bores:
a. Method 1: Transition/Repair Coupler/Coupling to be made with extra-long PVC coupler/coupling.
1) Transition couplings to be made with extra-long PVC coupler/coupling.
2) Minimum length of four (4) feet on bores 400 feet or less.
3) Minimum length of eight (8) feet on all bores greater than 400 feet.
4) Rated for a minimum working pressure of 250 psi unless shown otherwise on the Drawings.
5) Approved Manufacturers:
(a) CertainTeed.
(b) Harco.
(c) Napco Industries.
(d) Specified Fittings, LLC.
(e) Approved Equivalent.

b. Method 2: Extended Range Restrained Coupler/Coupling
1) May be installed with prior approval from Engineer.
2) Material: Shall be manufactured of ductile iron casting, meeting the requirements of ASTM A 536, grade 65-45-12 on all applicable parts, minimum-working pressure rating of 350 psi.
3) Grippers shall be machine sharpened and heat treated. Coated for superior corrosion resistance.
4) Draw hooks shall be of uncoated 304 stainless steel.
5) Coated with a fusion bonded epoxy.

6) Provide encasement in polyethylene conforming to ANSI/AWWA C105/A21.5.
7) Gaskets meeting ASTM D2000 and NSF61.
8) Ramp runners manufactured with black Nylon 66 and 14% glass filled.
9) Bolts and Nuts manufactured R-Blue with 5/8-11 bolts with heavy hex nuts coated to reduce friction and provide corrosion resistance. Washer manufactured of 304 stainless steel.
10) Type and Manufacturer:
(a) Alpha Restrained Coupling by Romac Industries, Inc.
(b) Approved Equivalent.

3. POLY to POLY – Rural Water Pipe, Directional Bores, and Cased Bores:
a. Method 1: Butt fusion of POLY pipeline to POLY pipeline.
b. Method 2: Electrofusion coupling; 200 psi pressure rating; AWWA approved.
c. Method 3: Extended Range Restrained Couplings
1) May be installed with prior approval from Engineer.
2) Material: Shall be manufactured of ductile iron casting, meeting the requirements of ASTM A 536, grade 65-45-12 on all applicable parts, minimum-working pressure rating of 350 psi.
3) Grippers shall be machine sharpened and heat treated. Coated for superior corrosion resistance.
4) Draw hooks shall be of uncoated 304 stainless steel.
5) Coated with a fusion bonded epoxy.
6) Provide encasement in polyethylene conforming to ANSI/AWWA C105/A21.5.
7) Gaskets meeting ASTM D2000 and NSF61.
8) Ramp runners manufactured with black Nylon 66 and 14% glass filled.
9) Bolts and Nuts manufactured R-Blue with 5/8-11 bolts with heavy hex nuts coated to reduce friction and provide corrosion resistance. Washer manufactured of 304 stainless steel.
10) Type and Manufacturer:
(a) Alpha Restrained Coupling by Romac Industries, Inc.
(b) Approved Equivalent.

4. DIPS to IPS - Rural Water Pipe, Directional Bores, and Cased Bores:
a. Method 1: Butt fusion of POLY pipeline to POLY pipeline.
b. Method 2: Electrofusion coupling; 200 psi pressure rating; AWWA approved.
c. Method 3: Extended Range Restrained Couplings
1) May be installed with prior approval from Engineer.
2) Material: Shall be manufactured of ductile iron casting, meeting the requirements of ASTM A 536, grade 65-45-12 on all applicable parts, minimum-working pressure rating of 350 psi.

3) Grippers shall be machine sharpened and heat treated. Coated for superior corrosion resistance.
4) Draw hooks shall be of uncoated 304 stainless steel.
5) Coated with a fusion bonded epoxy.
6) Provide encasement in polyethylene conforming to ANSI/AWWA C105/A21.5.
7) Gaskets meeting ASTM D2000 and NSF61.
8) Ramp runners manufactured with black Nylon 66 and 14% glass filled.
9) Bolts and Nuts manufactured R-Blue with 5/8-11 bolts with heavy hex nuts coated to reduce friction and provide corrosion resistance. Washer manufactured of 304 stainless steel.
10) Type and Manufacturer:
    (a) Alpha Restrained Coupling by Romac Industries, Inc.
    (b) Approved Equivalent.

2.03 GATE VALVES - RESTRAINED

A. Sizes 2-inch and 3-inch

1. Installation within manholes and structures
    a. End Connections: Flanged ends.
    b. Operation: Manual handwheel actuator.
2. Underground and/or buried installation
    a. End Connections: NPT threaded; ASME B16.4, Class 125.
    b. Provide with NPT threaded stainless steel adapter on each side of valve with permanently fastened IPS Poly Transition pipe spool (PE4710) inserted through entire fitting.
    c. Operating Nut: 2-inch square, unless otherwise specified.
3. Working Pressure: 250 psi, AWWA C515.
4. Materials:
    a. Body, Bonnet, and Single Wedge: Ductile iron (ASTM A53/A53M).
    b. Resilient seat.
    c. Stem: Stainless steel, non-rising.
    d. Exterior and Interior Coating: Fusion bonded epoxy; (AWWA C550).
    e. Hardware: Interior and Exterior type 316 stainless steel bolts, nuts, and washers; Bronze trim.
5. Ensure 5-foot separation between each side of valve and pipe couplers.

B. Sizes 4-inch and Larger:

1. End Connections: Mechanical joint; AWWA C153/A21.53.
2. Working Pressure: 250 psi, AWWA C515.
3. Operating Nut: 2-inch square.
4. Materials:
    a. Body, Bonnet, and Single Wedge: Ductile iron (ASTM A53/A53M).
    b. Resilient seat.
    c. Stem: Stainless steel, non-rising.
    d. Exterior and Interior Coating: Fusion bonded epoxy; AWWA C550.

e. Hardware: Interior and Exterior type 316 stainless steel bolts, nuts, and washers; Bronze trim.

5. Provide with IPS Poly MJ adapter on each side of valve.
6. Provide with stainless steel insert, gasket, C110 or C153 heavyweight gland, and stainless steel bolts and nuts
7. Connection of Poly MJ adapter to PVC pipe per Paragraph 2.02.A.1 or 2.02.A.2, depending on valve location.
8. Connection of Poly MJ adapter to Poly pipe per Paragraph 2.02.A.3, Method 1 or 2.

C. Provide with 6-inch Schedule 40 PVC valve box, valve box adapter, 5-foot carbon steel extension stem, and cover marked "WATER" for each valve installed for the Project.

D. Encase buried metallic valves with High Density Cross-Laminated (HDCL) polyethylene conforming to AWWA C105/A21.5.

E. Provide two (2) short operating wrenches of sufficient length for operating gate valves to Owner.

F. Approved Manufacturers:

1. American Flow Control Series 2500.
2. Approved Equivalent.

2.04 CONNECTIONS TO EXISTING PIPE

A. Connections to Existing PVC Pipe:

1. Saddle:
   a. All saddle shall be rated to meet or exceed the pressure rating of the adjacent pipes.
   b. For connection to pipes less than 3-inches in diameter:
      1) All Bronze Clamps; Confined "O" ring seal cemented in place, large bronze straps with curvature accurately designed to fit plastic pipe and silicone bronze screws.
   c. For connection to pipes 3-inches and larger in diameter:
      1) All Stainless Steel Band Clamps, Heavy gauge 18-8 Type 304 stainless steel construction, double bolt type with minimum band width of 4", and rubber gasket meeting ASTM D2000.
   d. Saddle outlet shall be of female AWWA/CC threading.
   e. May only be used where indicated on the Drawings.
   f. Manufacturers:
      1) Ford Meter Box Company.
      2) Cascade Waterworks Mfg. Company.
      3) Mueller Valve Company.
      4) Powerseal Pipeline Products Corporation.
      5) A.Y. McDonald Mfg. Company.
      6) Romac Industries, Inc.
      7) Approved Equivalent.
2. Tee:
   a. Install per Paragraph 2.01.C and Drawing details.

b. Use PVC coupler if pipeline continues on with PVC.
c. Use Poly pipe fusion or electrofusion coupler if pipeline continues on with Poly.

B. Connections to Existing Poly Pipe:

1. Saddle for pipeline sizes from 1-inch through 16-inch:
   a. Electrofusion branch saddle
      1) All saddles shall have a minimum pressure rating of 160 psi. If the adjacent pipeline has a pressure rating greater than 160 psi, then the saddle shall have the same pressure rating as the adjacent pipes.
      2) Shall be rated for use on poly pipe and approved for wet tapping pipeline.
      3) Manufacturers:
         (a) ISCO Industries.
         (b) Approved Equivalent.
      4) Saddles may not be used in lieu of tees unless specified in the drawings.
      5) Pressure rating and SDR to match that of connecting pipeline with a minimum allowable pressure rating and SDR of SDR 13.5 & Class 160 psi.
      6) Saddle outlet shall be of female AWWA/CC threading.
      7) May only be used where indicated on the Drawings.
   b. Stainless Steel Saddles
      1) Must be a full wrap saddle.Saddles may not be used in lieu of tees on all new pipelines unless specified in the drawings. Pressure rating and SDR to match that of connecting pipeline with a minimum allowable pressure rating and SDR of SDR 13.5 & Class 160 psi.
      2) All Stainless Steel Band Clamps, rated to be saddled and connected on to existing Poly pipe with spring washers, Heavy gauge 18-8 Type 304 stainless steel construction, double bolt type with minimum band width of 4", and rubber gasket meeting ASTM D2000.
      3) Saddle outlet shall be of female AWWA/CC threading.
      4) May only be used where indicated on the Drawings.
      5) Manufacturers:
         (a) Ford Meter Box Company.
         (b) Cascade Waterworks Mfg. Company.
         (c) Mueller Valve Company.
         (d) Powerseal Pipeline Products Corporation.
         (e) A.Y. McDonald Mfg. Company.
         (f) Romac Industries, Inc.
         (g) Approved Equivalent.
2. Tapping Tee
   a. All tapping tees shall have a pressure rating and SDR to match that of connecting pipeline with a minimum allowable pressure rating and SDR of SDR 13.5 & Class 160 psi.
   b. Manufacturers:
      1) ISCO Industries.

2) Approved Equivalent.

c. Must be a full wrap tapping tee.

d. Tapping Tees may only be used where indicated on the Drawings.

e. Tapping Tee outlet shall be of female AWWA/CC Pipe threading.

3. Tee:

a. Install per Paragraph 2.01.C and Drawing details.

b. If pipeline continues on with PVC connect to pipe per Paragraph 2.02.A.2 of this specification section.

c. If pipeline continues on with Poly connect to pipe per Paragraph 2.02.A.3 of this specification section.

2.05 CONNECTIONS TO NEW PIPE

A. Connections to New PVC Pipe:

1. For connection to pipes less than 5-inches in diameter:
   a. Use Poly fittings with PVC couplers per Paragraph 2.01.C and Drawing details.
   b. Use of saddles is not permitted in lieu of tees for new pipe.
2. For connection to pipes of 5-inches and larger in diameter:
   a. Use Poly fittings with PVC couplers per Paragraph 2.01.C and Drawing details.
   b. Use of saddles is permitted for connections to new pipe in lieu of tees with prior approval from Engineer.

B. Connections to New Poly Pipe:

1. 1-inch through 16-inch:
   a. Use Poly fittings with 5-foot spools and pipe fusion or electrofusion couplers per Paragraph 2.01.C.
   b. Use of saddles is not permitted in lieu of tees for new pipe, unless prior approval by Engineer is granted.

2.06 PIPE CASING REQUIREMENTS

A. Polyethylene Casing Pipe

1. May be required when crossing North Dakota State Highways; based on the requirements stated on the crossing's issued permit by the North Dakota Department of Transportation. Install as indicated on Drawings or as directed by Engineer.
2. Casing pipe shall meet the requirements to support the highway and live loads imposed on the highway and be at least two nominal sizes larger than the carrier pipe.
3. Casing pipe shall be manufactured to meet the requirements as indicated on the Drawings.

B. Steel Casing Pipe

1. All railroad crossing must be steel encased.
2. Must be rated as having a minimum yield strength of 35,000 psi.
3. A minimum wall thickness of 0.188-inches for casing pipe under 14-inches.
4. Casing pipe shall meet E-80 loading requirements.

5. Casing pipe shall be provided with cathodic protection or adequate coating, as required and approved by railroad.
6. Be designed for effective corrosion control.

C. Casing Spacers

1. Casing spacers shall be non-metallic spacers constructed of preformed sections of high-density polyethylene. Spacers should be ISO 9001:2000 certified for strength and quality.
2. Casing spacers should be projection type with the minimum number of projections around the circumference that total the number diameter.
3. Casing spacers shall be centered in a restrained position configuration within the casing pipe.
4. Spacer should also have a minimum height that clears the pipe bell or as otherwise indicated on the plans.
5. Manufacturer
   a. Raci Casing Spacers.
   b. Approved Equivalent.
6. Spacing
   a. As Detailed on the Drawings.

D. Casing End Seals

1. Once the carrier pipe has been installed inside of the casing pipe with all properly installed casing spacers, the annular space between the carrier pipe and the casing pipe shall be sealed by the installation of Modular Mechanical Seal at each end of the casing pipe and a rubber boot seal with stainless steel clamps.
2. Modular Mechanical Seal
   a. Seal shall be modular, mechanical type, consisting of inter-locking synthetic rubber links shaped to continuously fill the annular space between the carrier pipe and casing pipe.
   b. The elastomeric element shall be sized and selected per manufacturer's recommendations and have the following properties as designated by ASTM.
      1) -40 to +250°F (-40 to +120°C)
      2) EPDM: ATSM D2000 M3 BA510
   c. Color: Black
   d. Manufacturer
      1) PSI Pipeline Seal & Insulator, Inc.
      2) Cascade.
      3) Maloney.
      4) Approved Equivalent.
3. Boot Seals
   a. Approved Manufacturers:
      1) PSI Pipeline Seal & Insulator, Inc.
      2) Cascade.
      3) Maloney.
      4) Approved Equivalent.

2.07 1-INCH FLUSH/AIR BLOWOFF AND RESIDENTIAL CURB STOPS

A. Minneapolis Pattern curb stop:

1. Brass construction.
2. Inlet and outlet openings same size as the valve and having end connections as required for each installation.
3. Connect to water service leads by compression-type fittings.
4. Meeting or exceeding pressure rating of adjacent pipe.
5. Provide stationary rod extension with cotter pin manufactured of 316 Stainless Steel.
6. Riser cotter pin shall be comprised of 316 Stainless-Steel.

B. Provide with 8-foot, 4-inch SDR-21 PVC curb box with Stainless Steel stationary rod extension, Stainless Steel cotter pin, 3-inch PVC cap for centering, Stainless Steel stationary rod extension, Stainless Steel adjustable clamp to fit on Stainless Steel stationary rod extension, lid, and plug.

1. Owner shall direct contractor regarding the curb stop box location and height with respect to ground level. Curb stops used solely for pressure testing and/or disinfection of pipelines shall be placed in such a location as to not hinder with farming or road maintenance operations and be utilized a flushing location. Any disinfection curb stop not placed in a proper manner as determined by the Owner or Engineer shall be removed entirely.

C. Provide two (2) pentagon key, two (2) short shut off wrenches for use with extensions, and two (2) long shut off wrenches for use without extensions, of proper size and length for 1-inch flush/air blowoff and residential curb stop operation.

D. Manufacturers:

1. A.Y. McDonald Mfg. Company.
2. The Ford Meter Box Company.
3. Mueller Valve Company.
4. Approved Equivalent.

2.08 CORPORATION STOPS

A. Corporation Valve

1. Brass Construction.
2. Pressure Rating: Meeting or exceeding pressure rating of adjacent pipe.
3. Threading shall be of AWWA/CC threading.
4. Inlet and outlet openings same size as the valve.
5. Connect to watermain by use of tapped saddle fittings.
6. Must be of quarter turn operation with off/on indication, and must NOT have the ability to rotate 360 degrees.
7. Manufacturers:
   a. A.Y. McDonald Mfg. Company.
   b. Ford Meter Box Company.
   c. Mueller Valve Company.
   d. Approved Equivalent.

2.09 PRESSURE REDUCING VALVE

A. Manhole and Lid: See Section 33 31 01 and Drawings.

B. Valve Operation:

1. Valve shall automatically reduce higher inlet pressure to a steady lower pressure downstream regardless of changing flow rate or varying inlet pressure. The valve shall be pilot operated capable of holding pressure to a predetermined limit. The main valve and pilot valve shall close drip-tight if the downstream pressure exceeds the pressure setting of the control pilot. A check feature shall be provided. If pressure reversal occurs, the downstream pressure shall be admitted in the main valve cover chamber closing the valve to prevent return flow.

C. Minimum pressure rating: 250 psi.

D. Provide and install globe pattern, full body, hydraulically operated, pilot controlled, diaphragm-type valve.

E. Provide and install a lead free bronze body comprised of stainless steel and engineered plastics internal parts, with a fabric-reinforced diaphragm and a balanced single seat construction. Be constructed with a built-in dial set for valve regulator mechanism adjustment.

F. Temperature Range: Water to 180 degrees F.

G. Main Valve Materials:

1. Body and Cover: Ductile iron, ASTM A536.
2. Interior and Exterior: Fusion Bonded Epoxy Coating.
3. Disk Retainer and Diaphragm Washer: Cast Iron.
4. Trim (Disc guide, seat, and cover bearing): Stainless steel trim.
5. Disc: Buna N Rubber.
6. Diaphragm: Nylon reinforced Buna N.
7. Stem, Nut, and Spring: Stainless Steel.
8. Valves shall be supplied with valve position indicator.
9. The main valve shall be serviceable in the line through a single flanged cover that provides easy access to all internal components.
10. Include pressure gauges.

H. Pilot System Materials:

1. Trim: Stainless Steel Type 303.
2. Rubber: Buna N Synthetic Rubber.
3. Pilot Accessories: "Y" strainer, isolation cocks, speed controls, and check valve feature.
4. Fittings: Brass.
5. Tubing: Polypropylene or Nylon Tubing, minimum pressure rating 250 psi.

I. Acceptable Manufacturer:

1. Cla-Val Model 90-01.
2. Approved Equivalent.

J. Schedule:

1. 2-inch PRV Manhole - Base Bid 1 (Sheet T39 and D4)
   a. Valve Size: 2-inch (1 required)
   b. Adjustment Range: 20 to 105 psi.
   c. Factory Set: 80 psi.
2. Webster PRV Manhole - Base Bid 3 (Sheets T10, D4, and D10)
   a. Valve Size: 2-inch (1 required)
   b. Adjustment Range: 15 to 75 psi.
   c. Factory Set: 45 psi.

2.10 BALL VALVES

A. General

1. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.
2. Unless otherwise indicated, use valves suitable for 200 psi minimum working pressure.
3. Valve Operators, as shown on the Drawings or as specified.
4. All valves must meet NSF 61 requirements.

B. Valve Connections

1. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use full port size valves.
2. Thread pipe sizes 1-1/2 inches and smaller unless indicated otherwise.

C. Design:

1. Manual ball valves up to 2-inch size:
   a. Body: Bronze.
   b. Ball and Stem: Stainless Steel.
   c. Seats: Glass-reinforced durafill.

D. Approved Manufacturer and Type:

1. Manual ball valves up to 2-inch size:
   a. Series B-6000 ball valve by Watts Regulator Company.
   b. Approved Equivalent.

E. Operation:

1. Quarter turn shut off.
2. Provide accessories (including compression fittings, NPT adaptors, etc.) to ensure complete operating system. All accessories shall be corrosion resistant to the application.

2.11 METER SETTER UNITS

A. Residential Meter Setter Units:

1. Assembly:
   a. 3/4-inch inlet and outlet.
   b. Suitable for installation of 5/8-inch x 3/4-inch meter and pressure regulator.

c. Copper and/or brass construction.
d. Provide with required adapters, meter couplings, and lockwing ball valve(s) for complete installation.
e. Ball Valves shall be:
    1) Ford Meter Box Company - B11-333-HB-34 NL Style.
    2) A.Y. McDonald Mfg. Company - 72032T - Full Port Style.
f. Double Check Valve: Series 7, Backflow Preventer, bronze body, Buna-N seals and stainless-steel springs, manufactured by Watts Regulator Company, or Equal.
g. Flow Restriction Valve: G-Series Regulator rated for 7 gpm, manufactured by Dole Flow Regulator or Equal.
h. Pressure Reducing Valve:
    1) Watts Regulator Company, Series LF5M3-Z6, lead free brass body, stainless steel strainer, spring, and trim.
    2) Approved Equivalent.
i. Coupling to service lead piping shall be made with copper couplers.

B. Frost-Proof Residential Meter Pits:

1. Riser Pipe: 15-inch diameter by 8’-3” length; SDR-35 PVC pipe as shown on Drawings.
2. Riser Lid: Cast iron center locking lid.
3. Insulated Plug Assembly: 15-inch diameter by 4-inches thick; provide with extraction handle with back support plate or washers to avoid handle pull-through during removal.
4. Provide with plastic stabilizing platform and wall-mounted platform stops to support meter setter assembly above flexible piping. Stops shall be glued to interior wall surface. Do not drill through pit wall to install mounting hardware.
5. Ball Valves shall be:
    a. Ford Meter Box Company - B11-333-HB-34 NL Style.
    b. A.Y. McDonald Mfg. Company - 72032T - Full Port Style.
6. Interior Rigid Piping: ASTM D1785, Schedule 80 PVC pipe.
7. Interior Flexible Piping:
    a. 3/4-inch polybutylene water service tubing conforming to requirements of ASTM D2581.
8. Rated for a minimum working pressure of 250 psi, with thermoplastic dimension ratio (SDR) not to exceed 9.
9. Meter Setter Assembly:
    a. 3/4-inch inlet and outlet.
    b. Suitable for installation of 5/8-inch x 3/4-inch meter and pressure regulator.
    c. Copper and/or brass construction.
    d. Provide with required adapters, meter couplings, and lockwing ball valve(s) for complete installation.
    e. Provide with dual angle check valve unit manufactured by Watts Regulator Company, or Equal.
    f. Pressure Reducing Valve:
        1) Watts Regulator Company, Series LF5M3-Z6, lead free brass body, stainless steel strainer, spring, and trim.

2) Approved Equivalent.

g. Coupling of service lead piping shall be made with copper couplers.

10. Provide and install 8-foot 4x4 treated lumber post (install post 5-feet below ground surface) adjacent to meter pit for mounting of radio meter reading unit.

C. Meters:

1. Conform to AWWA C700.
2. Size and Type: 5/8” x 3/4”; magnetic drive, sealed register, positive displacement, oscillating piston, and measurement with volumetric readout in gallons.
3. Meter shall be made of "lead free" alloy as defined by NSF 61, Annex G and Annex F.
4. Liquid crystal display (LCD): 9 digit display; Programmable direction of flow, and smart water alarms.
5. Operating Environment: 33 degrees Fahrenheit to +149 degrees Fahrenheit.
6. All maincase bolts shall be of 300 series non-magnetic stainless steel to prevent corrosion.
7. Compatible with Neptune R900 radio transceiver.
8. Meters installed or to be installed in frost-proof meter pits shall be submersible type meters.
9. Acceptable Manufacturers:
   a. Neptune T-10 Series, E-Coder-compatible and equipped with a ProRead Register with Neptune R900 Radio Meter Reading Unit (submersible if required).

D. Radio Meter Reading Unit:

1. Wall or post-mounted installation for non-pit, non-submersible environment.
2. Pit mounted installation for pit, submersible environment as necessary.
3. Compatible with Neptune T-10 Series.
4. Meter Interface Unit (MIU) Dimensions: 4.4” W x 6.2” H x 2.5” D for wall MIU and 4.2” W x 6.2” H x 2.4” D for pit MIU.
5. Operating Temperature: -22 degree Fahrenheit to +149 degree Fahrenheit.
6. Broadcast Power: 1 watt.
7. Frequency Range: 910-920 MHz.
8. Transmitter channel: 50 channels with frequency-hopping, spread spectrum.
9. Encoder register reading interval: 15 minutes.
10. Data logging interval: 96 days of hourly data.
11. Batteries: Lithium battery with HLC capacitor.
12. Warranty: 20 year.
13. Approvals: FCC 15.247.
14. Manufacturer: Neptune R900M series.

E. Pipe and Fittings: Copper and/or brass as shown on Drawings.

F. Pressure Gauges (Residential Meter Setter Units only):

1. Size: 2-inch dial.
2. Range: 0-160 psi.
3. Case: 304 stainless steel case with acrylic window, white aluminum dial face with black graduations and markings, and black pointer.
4. Movement: Brass bourdon tube.
5. Mounting: Brass stem, ¼-inch NPT.
6. Provide with brass pressure snubber sized for gauge mounting stem.
7. Series D80 as manufactured by Trerice Company, or Equal.

2.12 BEDDING AND BACKFILL MATERIALS

A. Bedding: Fill Type S1 and Type S2, as specified in Section 31 05 13

B. Backfill: Fill Type S1 and Type S2, as specified in Section 31 05 13.

2.13 ACCESSORIES

A. Concrete for Thrust Restraints and Splash Pads: Premixed bagged concrete consisting of aggregate and Type I Portland Cement. Form and pour thrust restraints for pipe, fittings, and plugs as shown on the Drawings.

B. Bolts and Related Hardware: Stainless steel underground bolts, including all bolts on fittings, valves, hydrants, and transition couplers. Properly lubricate bolts to prevent seizing.

2.14 POLYETHYLENE ENCASEMENT

A. Conform to ANSI/ASTM D1248 and install per AWWA C105/A21.5.

B. High Density Cross-Laminated; 4 mil minimum thickness.

C. Install on all underground metallic items, including: ductile iron pipe, ductile iron fittings, gate valves, other metal pipe and fittings, fire hydrants, stainless steel couplings, transition couplings, and service and testing tapping saddles.

EXECUTION

3.01 EXAMINATION

A. Verify existing conditions under provisions of Section 01 31 19.

3.02 PREPARATION AND STORAGE

A. Store pipe on-site on flat surface so barrel is evenly supported. Do not stack higher than 6 feet. Cover pipe with opaque material for extended storage.

B. Remove scale and dirt on inside and outside before assembly. Inspect for damage to pipe and other materials before installation.

C. Store all valves and appurtenances according to manufacturer’s recommendations.

3.03 INSTALLATION - PIPE AND APPURTENANCES

A. Pipe fusion for HDPE pipelines

1. Contractor shall be allowed to fuse ahead of pipeline installation if all the following conditions are met:
   a. Contractor receives approval of fusing plan from Engineer or Owner prior to commencement of fusing.
   b. Contractor receives approval from Owner or Engineer if fused pipe is not able to be installed within ten (10) days of being fused.
   c. Contractor maintains total access to land on which pipe is being fused. Contractor shall not block or otherwise restrict the use of points of entry to land, including, but not limited to, approaches, driveways, trails, and roads.
2. Owner and Engineer reserve the right to restrict fusion of HDPE pipe in the following ways including, but not limited to:
   a. Distance in advance of pipeline installation where pipe can be fused.
   b. Hours of the day where fusion can occur.
   c. On parcels of land which may not have sufficient easements or permits or which may possess agricultural crops nearing harvest.

B. Install all pipe and appurtenances in strict accordance with manufacturer's recommendations.

1. Contractor shall submit three (3) copies of Form B – Material Handling and Installation Certification prior to or accompanying Contractor’s first pay application request for pipe installation. A copy of Form B follows this Section. Refer to Form B for specific requirements.

C. Contractor shall ensure all installed pipelines will be locatable per state standards.

D. Contractor shall coordinate with Engineer to record installed locations of all pipelines during installation.

E. Install water mains at a minimum cover depth of 90 inches (7.5 feet) below finished grade to top of pipe, unless noted elsewhere. In areas of graveled or compacted driveways and parking lots, pipe depths shall be increased to a minimum cover of 96 inches (8 feet). Construct to lines, grade, and dimensions as detailed on construction Drawings.

F. Set buried fittings on concrete blocks and pads that rest on solid bearing soils.

G. Do not gouge or mar pipe in any fashion.

H. Take up and relay any pipe disturbed from its required grade or alignment.

I. Keep trenches free from water until pipe jointing is complete.

J. Securely close open ends of pipe and fittings when Work is not in progress.

K. Cut pipe in a neat and workmanlike manner by an approved mechanical cutting machine.

L. Install pipe to allow for expansion and contraction without stressing pipe or joints.

M. Connect new water supply to existing water supply where shown on Drawings. Notify Engineer at least 7 days in advance of the time connections are to be made and coordinate connection operations with the Owner in effort to minimize interference with existing water system service.

N. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main per Drawing details.

O. Grade water main to avoid high spots and air pockets.

P. Install water main and appurtenances to avoid existing utilities.

Q. Install pipe such that maximum deflections from straight line or grade do not exceed manufactures specifications. Install bend fittings where maximum deflections are exceeded.

R. Pipelines shall be installed to the horizontal alignment shown on the Drawings or staked in the field with a tolerance of +/- 5.00'. The Contractor shall correct any deviation in the horizontal alignment that results in the bore(s) colliding with utilities that parallel the proposed pipeline route at no additional cost to the Owner. Corrective measures may include boring a new pipe length in a new location and abandonment and filling of bore hole placed in error. The Contractor must obtain approval from the Owner and Engineer prior to implementation of any corrective measures.

S. **Provide adequate adapters and couplers for connections of different pipe types and sizes.**

T. Where and as directed by Engineer, pipelines shall be installed by the trenchless installation methods to avoid disturbance of surface features. Refer to Specification 33 05 07. All boring pits shall be sheathed and braced, as necessary, to provide a safe place for workmen. The Contractor shall comply with all applicable OSHA safety requirements relating to this type of construction. Separate Bid items are provided for water main installed by non-cased bore methods, and payment will be made only where specifically requested by Engineer. Contractor may install additional pipe by trenchless installation methods for his convenience in crossing utilities, surfaces, or surface items that would require restoration; however, this pipe shall be paid for at the unit bid price for watermain installed by open cut methods.

U. Excavate and backfill trench in accordance with Section 31 23 16 and Section 31 23 23, respectively.

3.04 INSTALLATION – VALVES, FLUSH CLEANOUTS, CURB STOPS, AND CORPORATION STOPS

A. Locate curb stops, gate valves, air release valves, pressure reducing valve, etc. as directed by Engineer.

B. Contractor shall ensure all installed fittings, valves, and other underground appurtenances will be locatable per state standards.

C. Contractor shall coordinate with Engineer to record locations of all fittings, valves, and other underground appurtenances during installation.

D. Set buried valves on concrete blocks and pads that shall rest on solid bearing soils per Drawing details.

E. Center and plumb valve box over valve or curb stop. Set valve box cover flush with finished grade or as shown on Drawings.

F. Locate valves outside road or street areas.

G. Provide down-stream side of curb stop with polyethylene pipe to the surface. Provide suitable cap to prevent entrance of dirt and other foreign materials.

H. Set cleanouts to existing grade or as shown on Drawings.

I. Locate control valve a minimum of 2 feet away from discharge.

J. Provide a drainage pit for cleanouts, consisting of not less than 5 cubic feet washed gravel.

K. Provide suitable cap to prevent entrance of dirt and other foreign materials on ends of pipe until final connections are completed.

L. Install flush cleanout curb stops plumb, on a concrete pad, and to existing grade or as shown on Drawings.

M. Encase all ductile pipe valves, gate valves, transition couplings, and fittings in polyethylene encasement.

N. Install service lead curb stops plumb and per details contained in Drawings.

O. Excavate and backfill trenches in accordance with Sections 31 23 16 and 31 23 23, respectively.

3.05 INSTALLATION – RESIDENTIAL METER SETTERS AND FROST-PROOF RESIDENTIAL METER PITS

A. Install all pipe and appurtenances in strict accordance with manufacturer's recommendations. The residential meter assembly will either be installed in a frost-proof meter pit or provided to the homeowner as designated by the Engineer.

B. Contractor shall provide Residential Meter Setter Units to Owner for delivery by Owner to Owner’s customers. Installation shall be by customer’s plumbing contractor per Owner’s requirements.

C. Contractor shall provide Frost-Proof Meter Setter Units' meters to Owner for delivery by Owner to Owner's Customers and Contractor shall furnish and install Frost-Proof Meter Setter Units (less meter) and 4x4 treated lumber post.

1. The Contractor's attention is called to the fact that work performed under this section of the specifications represents that portion of the Work that most directly affects the membership of the District. A higher degree of finish requirements will be required for this portion of the project. The Contractor will be responsible for damage to any structure, utility, sidewalks, curb and gutter, culvert, etc., damaged or removed during construction, whether within the project area or on private property and shall be responsible for replacing or repairing same to the satisfaction of the owner, and at the direction of the Engineer at no additional cost to the Owner.
2. Contractor will be required to return the disturbed area back to original condition and the area shall be reseeded.
3. The disturbed areas shall be reseeded per Section 32 92 19.
4. Services shall be located as staked by the Engineer and shall consist of all items shown on the Drawings and covered in these specifications. Excavation for the installation of meter pits shall be at minimum to allow for proper installation and shall be at a depth required to allow entry to the basement and provide a minimum of 7.5 feet of cover on the service line or such that the pit will rest on undisturbed earth and be at the required depth.
5. Backfill around meter pits shall be tamped and the soil tapered from the top of the lid to a point two (2) feet away to normal ground level. The backfill shall be raked to a smooth condition and all other excess materials hauled away from the area. No meter pits shall be left open on the user side for the user's convenience unless the Contractor assumes responsibility for its final appearance.
6. Contractor shall install the meter pit to assure the meter is easily accessible for the resident to take monthly meter readings.

D. All meters and radio meter reading units shall be provided to Owner. Owner or customer’s plumbing contractor will install meters and radio meter reading equipment.

3.06 FLUSHING OF SYSTEM WATER LINES

A. Flush water lines thoroughly before water system is placed into operation.

B. Maintain velocity in main of not less than 2.5 feet per second to ensure proper flushing of water lines.

C. Pipelines one and a half (1.5) inches and Larger: Fill water main to expel all air from main. “Poly Pig” all newly installed pipelines using potable water source. Contractor shall prepare a proposed “pigging” plan and review with Engineer and Owner prior to implementation.

D. The system water pipelines shall be flushed after chlorination until the chlorine residual level is below 1.0 mg/L.

3.07 FIELD QUALITY CONTROL

A. Per Section 01 45 00 - Quality Control.

B. Hydrostatic Testing - All Pipelines except Poly (HDPE) Pipeline

1. Subject newly laid pipe to a leakage and hydrostatic pressure test for a period of two hours at a minimum pressure of 1.5 times or 50 psi greater than the normal working pressure of the installed line, whichever is greater than the normal working pressure of the installed pipe.
2. Fill water main with water a minimum of 24 hours before the test and expel all air from the main.
3. Avoid development of waterhammer in pipeline.
4. Add make-up water from a vessel of known volume whenever gauge pressure at the test point fall 5 psi below the required test pressure or on a continuous basis if a suitable by-pass test pump is used, when performing the test.
5. Pressure test service leads with water mains prior to connection to user services.
6. Allowable Leakage is defined by the following equation:
    a. $Q = (LD\sqrt{P})/148{,}000$ Where:
        1) Q= maximum permissible leakage rate in gallons per hour for the length of line being tested
        2) L= length of the line being tested in feet
        3) D= internal diameter of the pipe in inches
        4) P= average test pressure in psig.
7. Locate and repair any defective areas if test fails.
8. Retest after completion of repairs.
9. Repeat procedure until tests pass.
10. Complete, execute, and submit to Engineer the Pressure Test Report for each pressure test after pressure test completion and Engineer examination.

C. Hydrostatic Testing for Poly (HDPE) Pipeline

1. Subject newly laid pipe to a leakage and hydrostatic pressure test at a minimum pressure of 1.5 times or 50 psi greater than the normal working pressure of the installed line, whichever is greater than the normal working pressure of the installed pipe.
2. Fill water main with water a minimum of 24 hours before the test. Ensure thermal equilibrium and allow any dissolved air to be expelled from the main prior to pressure testing.
3. Avoid development of waterhammer in pipeline.
4. Begin initial expansion phase by gradually pressurizing the watermain, adding any make up water as necessary to reach and maintain testing pressure for four (4) hours. The initial expansion phase does not require monitoring amount of water added.
5. Upon maintaining testing pressure for four (4) hours, immediately begin test phase by reducing test pressure by 10 psi, cease adding water, and monitor pressure for one (1) hour.
6. If during/after completion of test phase, the test pressure remains steady (within 5% of the target value) and no visual leakage is observed, no leakage is indicated and water main passes hydrostatic pressure testing.
7. Complete, execute, and submit to Engineer the Pressure Test Report for each pressure test after pressure test completion and Engineer examination.

8. Depressurize the main at a controlled rate to avoid water hammer.
9. If during/after completion of test phase, the test pressure does **not** remains steady (within 5% of the target value) and/or visual leakage is observed, no leakage is indicated water main fails the pressure test.
10. Locate and repair any defective areas if test fails.
11. Retest after completion of repairs.
12. Repeat procedure until tests pass.
13. Complete, execute, and submit to Engineer the Pressure Test Report for each pressure test after pressure test completion and Engineer examination.
14. Depressurize the main at a controlled rate to avoid water hammer.

D. To limit the loss of chlorine residual, new pipeline must be considered online and ready for Owner use within seven (7) days after bacteria sample testing is complete and satisfactory. This includes any required hydrostatic testing and retesting. See section 33 01 10 for pipeline disinfection and bacterial testing requirements.

3.08 RAILROAD, TOWNSHIP, COUNTY, STATE ROAD, AND WETLAND CROSSINGS

A. See Section 33 05 07 for requirements.

3.09 UTILITY CROSSING REQUIREMENTS

A. Install water mains no closer than a horizontal distance of 10 feet from the sewer, except when crown of the sewer is at least 18 inches below invert of the water main and the sewer pipe is laid in a separate trench or water main is laid to one side of common trench on a bench of undisturbed soil, separation shall be 6 feet horizontally.

B. Where new water main crosses an existing sewer:

1. Center full length of water main over sewer if crossing is within 3 feet above or below sewer.
2. No additional protection required if water main is at least 3 feet above sewer.

C. Where new water main crosses an existing utility, including but not limited to fiber, telephone, petroleum, and natural gas pipes:

1. A minimum vertical distance of 2' from bottom of utility to top of water main must be maintained.
2. All requirements with corresponding utility easements must be met.
3. Contractor to coordinate crossing with utility owner, where necessary.

D. Provide thoroughly compacted backfill between pipes where a new pipe crosses a new or existing pipe for adequate support.

E. Utility Crossings may be installed via trenchless installation methods if requested by Engineer, see Section 33 05 07. The length of the bores is shown on plans or will be determined by the Engineer's Field Representative as outlined in Section 01 22 00.

3.10 DATA FOR AS-BUILT RECORDS

A. Contractor shall ensure all installed pipelines, fittings, valves, and other underground appurtenances will be locatable per state standards.

B. Contractor shall coordinate with Engineer to record locations of all pipelines, fittings, valves, and other underground appurtenances during installation.

C. Fusion Data Recording For As-Builts:

1. For 6” and larger pipe sizes, McElroy Datalogger or equivalent fusion data recorder shall be used to record all fusion welds on hydraulically operated fusion machines. The device shall be capable of meeting the requirements of ASTM F 3124, “Standard Practice for Data Recording the Procedure used to Produce Heat Butt Fusion Joints in Plastic Piping Systems or Fittings”. The device, or combination of devices, shall record the following variables of each fused joint:
   a. Heater surface temperature- immediately before inserting the heater plate, measure with a pyrometer and manually enter into the weld record.
   b. Gauge pressure during the initial heat cycle
   c. Gauge pressure and elapsed time during the heat-soak cycle
   d. Heater removal (dwell) time
   e. Gauge pressure and elapsed time during the fusing/cool cycle
   f. Drag pressure
   g. Pipe diameter and wall thickness
   h. Type of HDPE/PVC material(Specification and Classification) and manufacturer
   i. Fusion Machine Identification
2. The device shall record the operator’s name and a unique operator ID number, along with the date and time of each weld.
3. Records showing the device is up to date on all required calibration should be available for presentation when requested.
4. All fusion welds should be traceable to the report (via operator and weld ID) with an indentation weld stamp or by permanent paint marker/pen next to fusion weld.
5. A weld location map may be requested, prior to commencement of work, by the owner or owner’s representative.
6. All finalized data logged from the Datalogger shall be provided to the Owner and Engineer. Data shall be submitted under the same Submittal process as used for Shop Drawings.

END OF SECTION 33 10 00

SECTION 33 31 01
MANHOLES AND CASTINGS

SUMMARY

1.01 SECTION INCLUDES:

A. Prefabricated Polyethylene (HDPE) manhole with integral base, cover, and pipe.

B. Manhole casting and fabricated frame and cover.

C. Related Section include, but are not limited to:

1. Section 01 22 00 – Unit Price Measurement and Payment.
2. Section 01 33 00 – Submittal Procedures.
3. Section 01 45 00 – Quality Control.
4. Section 31 05 13 – Soils for Earthwork.
5. Section 31 05 16 – Aggregates for Earthworks.
6. Section 31 23 16 – Excavation.
7. Section 31 23 19 – Dewatering.
8. Section 31 23 23 – Fill and Backfill.
9. Section 32 90 00 – Landscape Grading.
10. Section 32 92 19 – Seeding.
11. Section 33 01 10 – Disinfection of Water Utility Piping Systems.
12. Section 33 10 00 – Water Utilities.

1.02 REFERENCES

A. References include, but are not limited to:

1. ASTM A48/A48M – Grey Iron Castings.
2. ASTM C443 – Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
3. ASTM C478 – Circular Precast Reinforced Concrete Manhole Sections.
4. ASTM C76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
5. ASTM C150/C150M – Portland Cement.
6. ASTM C923 – Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
7. ACI 318 – Building Code Requirements for Structural Concrete.
8. ASTM A615/A615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
9. ASTM A416/A416M – Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete.
10. ASTM A36/A36M – Carbon Structural Steel.
11. AWS D1.1/D1.1M – Structural Welding Code - Steel.
12. ASTM C260/C260M – Air-Entraining Admixtures for Concrete.
13. ASTM C494/C494M – Chemical Admixtures for Concrete.
14. ASTM C858 – Underground Precast Concrete Utility Structures.
15. ASTM A496 - Deformed Steel Wire for Concrete Reinforcement.
16. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

17. Federal Specification SS-S-00210 - Pre-formed Plastic Sealing Compound.
18. ASTM F1759 - Design of High Density Polyethylene (HDPE) Manholes for Subsurface Applications
19. ASTM D2321 - Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
20.

1.03 SUBMITTALS FOR REVIEW

A. Section 01 33 00 – Submittals: Procedures for submittals.

B. Shop Drawings: Indicate manhole types, locations, elevations, piping, and conduit sizes and elevations of penetrations.

C. Product Data: Provide manhole covers, component construction, features, configuration, and dimensions.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with a minimum of three (3) years experience.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry Work.

PRODUCTS

2.01 MATERIALS

A. Prefabricated Polyethylene Manholes

1. Corrosion resistant, watertight lightwieght polyethylene construction
   a. 24-inch diameter cone section
      1) Eccentric, curved design as shown on drawings.
   b. 38-inch diameter riser base section
   c. 39.5-inch diameter polyethylene liner.
   d. Sump pit integral to manhole body to allow for proper drainage of structure.
   e. Structure to be preassembled when shipped to site.
2. Internal platform: factory installed 360° polyethylene bench
3. Shall be designed and tested to bury depths of 25 feet. Acutal bury depth shall be as indicated on drawings.
4. Compatible with unistrut mounting, if applicable.
5. Testing
   a. Manhole shall be air tested by manufacturer for watertightness to prevent leaks and infiltration.
6. Accpetable manufacturers
   a. QuickStream Solutions, Inc.
   b. Approved equivalent.
7. Schedule

a. Webster PRV Manhole
    1) Location: T155N-R64W-S16
    2) Drawing: T10, D10, D13
    3) Bid Phase: Base Bid 3
b. 2" PRV Manhole
    1) Location: T150N-R60W-S30
    2) Drawing: T39 & D4
    3) Bid Phase: Base Bid 1

2.02 COMPONENTS

A. Prefabricated Polyethylene Manholes

1. Manhole Connections
    a. Join all manhole/structure connections larger than 4” nominal OD pipe by butt fusion, electrofusion, or flanged connections using an HDPE flange adapter and metallic backup ring with a bolt pattern per ASME B16.5 or B16.47 Series A.
    b. For 4" OD pipe and smaller, threaded transition fittings can also be used as well as the connections for 4” and larger.
    c. Employing mechanical couplings or similar connections requires approval by the project engineer.
2. Butt Fusion Welds
    a. Make all butt fusion welds as decribed in ASTM F2620 and all butt fusion welds performed with hydraulically operated butt fusion equipment shall be recorded using a data acquisition device.
    b. The fabricator shall maintain records of the temperature, pressure, and graph of the fusion cycle for a minimum of 3 years.
3. Manhole Penetrations
    a. Fused 2-inch DR 11 polyethylene
        1) Shall be fused through riser section and integral to manhole body to create watertight seal
        2) 12-inch stub outside of manhole riser on inlet and outlet sides
    b. As shown on drawings.
4. Access Ladder: Fiberglass
    a.
    b. Maximum 12-inch on-center vertical spacing.
5. Manhole Lid: Polyethylene
    a. Removable, sealed, lockable lid
    b. Shall attached to manhole cone by stainless steel pins
    c. Shall include vent pipe to be attached to lid
6. Conduits for electrical wiring
    a. 2" DR 11 polyethylene
        1) Shall be fused through riser section and integral to manhole body to create watertight seal
        2) Shall extend 14-inches above final grade
        3) Minimum 2-inch spacing between conduits, if applicable.
7. Sump pump
    a. Submersible
    b. Vertical or tethered integral float switch
    c. Cast iron or stainless steel construction

d. Minimum lift: 10 ft.

8.

EXECUTION

3.01 EXAMINATION

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify excavation for manholes is correct.

D. Inspect manholes upon delivery. Reject any cracked or otherwise visibly defective units or components.

3.02 PREPARATION

A. Coordinate placement of inlet and outlet pipe.

3.03 PLACING MANHOLE

A. Prefabricated Polyethylene Manholes

1. Trench Construction
   a. Construct the trench and trench bottom in accordance with ASTM D2321 . Install the polyethylene manhole/structure on a gravel or crushed rock base consisting of 12” in thickness of Class I materials compacted to 95% proctor density per ASTM F1759 . All required safety precautions for manhole/structure installation are the responsibility of the installation contractor.
2. Embedment Materials
   a. Embedment materials shall be Class I or Class II materials as defined by ASTM D2321 Class I or flowable fill (controlled low strength material /CLSM) materials are preferred. Backfill and bedding materials shall be free of debris.
3. Support pipe within manhole as necessary.
4. Backfill and compact per specifications.

END OF SECTION 33 31 01

DIVISION 40
PROCESS INTEGRATION

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SECTION 40 05 06
COUPLINGS, ADAPTERS, AND SPECIALS FOR PROCESS PIPING

COUPLINGS, ADAPTERS, AND SPECIALS FOR PROCESS PIPING

1.01 GENERAL

A. Summary

1. Section Includes:
   a. Furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:
      1) Restrained Flange Adapters.
      2) Filler Flanges.
2. Related Sections include:
   a. Section 40 05 07 - Hangers and Supports for process piping.
   b. Section 40 05 35 - High-Density Polyethylene Process Pipe.
   c. Section 40 05 58 - Process Valves.

B. SUBMITTALS

1. Shop Drawings and Product Data shall be submitted in accordance with specification Section 01 33 00 - Submittal Procedures.
2. Operations and Maintenance Data shall be submitted in accordance with specification Section 01 78 23 - Operation and Maintenance Data.

C. REGULATORY REQUIREMENTS

1. All Products that come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

1.02 PRODUCTS

A. SPECIALTIES CONNECTIONS

1. Provide pipe specialties suitable to connect to adjoining pipes as specified for pipe fittings. Diameter to match adjacent and adjoining piping.

B. WORKING PRESSURE

1. Working pressure of pipe specialties to be equal to working pressure of connecting pipes, unless specified otherwise.

C. Restrained flange adapters for PVC Pipe

1. Ductile Iron conforming to ASTM A536.
2. Shall have a minimum working pressure equal to adjacent pipe.
3. Shall be provided with manufacturer applied epoxy coating.
4. Shall include torque limiting screws to insure proper initial set of gripping wedges.
5. Type and Manufacturer:

a. Series 2100 MegaFlange by EBAA Iron, Inc.
b. Series 7200 Super Flange by Star Pipe Products.
c. Approved Equivalent.

D. Restrained flange adapters for POLY Pipe

1. See Section 40 05 35 - High-Density Polyethylene Process Pipe.

E. Filler Flange

1. Ductile iron conforming to the requirements of AWWA C115, maximum 250 psi working pressure.

1.03 EXECUTION

A. Installation

1. Install in accordance with manufacturer's recommendations.
2. Install equipment in locations shown on the Drawings.

B. Restrained flange Adapters

1. After the pipe is in place and bolted tight, the proper locations of holes for anchor studs or lock pins shall be determined and the pipe shall be field-drilled.
2. Holes for anchor studs or lock pins shall be drilled completely through the pipe wall. Hole diameters shall not be more than 1/8-inch larger than the diameter of the stud projection.
3. The inner surfaces of the couplings shall be prepared for coating in accordance with the instructions of the coating manufacturer and shall then be coated with liquid epoxy in accordance with ANSI/AWWA C210. The remaining surfaces, except the flange mating surfaces, shall be cleaned and shop primed with universal primer.

C. Filler Flanges

1. Ductile iron conforming to the requirements of AWWA C115, maximum 250 psi working pressure.
2. Match filler flange to adjoining pipe working pressure class.

END OF SECTION 40 05 06

SECTION 40 05 07
HANGERS AND SUPPORTS FOR PROCESS PIPING

HANGERS AND SUPPORTS FOR PROCESS PIPING

1.01 GENERAL

A. SUMMARY

1. Section includes:
   a. Pipe and equipment hangers, supports, and associated anchors.
2. Related Sections include:
   a. Section 40 05 06 - Couplings, Adapters, and Specials for Process Piping.
   b. Section40 05 58 - Process Valves.

B. REFERENCES

1. Reference Standards include:
   a. ANSI B 31.10: Pipe Supports.
   b. ASTM A36: Structural Steel.
   c. ASTM A325: High Strength Bolts for Structural Steel Joints.

C. SUBMITTALS

1. Shop Drawings and Product Data shall be submitted in accordance with specification Section 01 33 00 - Submittal Procedures.
   a. Shop drawings shall be signed and sealed by a Registered Professional Engineer. Submittal shall include detailed plan and sections illustrating the layout of only the pipe system. Drawings shall include referenced details that specify all sizes and hardware for all components of support. Include maximum loading of detailed support.
2. Operations and Maintenance Data shall be submitted in accordance with specification Section 01 78 23 - Operation and Maintenance Data.

1.02 PRODUCTS

A. GENERAL

1. In certain locations anchors, expansion joints, and pipe supports have been indicated on the Drawings, but no attempt has been made to indicate every restraint, anchor, and expansion joint. It shall be the Contractor’s responsibility to provide a complete system of pipe supports, to provide expansion joints, and to anchor all piping in accordance with the requirements set forth herein.
2. Pipe supports located within grate covered trenches shall be constructed entirely of stainless steel.
3. Pipe supports located within basins or are submerged shall be constructed entirely on stainless steel or concrete, unless otherwise indicated on the Drawings .

B. DESIGN RESPONSIBILITY

1. When specific concrete and fabricated steel supports are shown, Contractor shall provide and install said supports as indicated on the Drawings. Any deviation from pipe shown supports within the Drawings shall only be allowed with the written consent of the Engineer of Record.
2. When pipe supports are not shown it shall be the responsibility of the Contractor to design, size, and layout pipe supports as specified herein and in accordance with the standard details provided in the Drawings.
3. Minimum requirements for support system are provided in Article 3.02 herein.
4. Design shall be provided by a Registered Professional Engineer who is a full time employee of the pipe support supplier.
5. Typical pipe supports shown on the Drawings may or may not be located in a manner that allows for direct bracing to a structural member that has sufficient capacity to resist the pipe support loads. The contractor shall be responsible for adjusting and coordinating the location of supports with the Engineer. The Contractor shall be responsible for providing additional structural framing or modifications to specified structural framing.
6. Piping systems and pipe connections to equipment shall be properly anchored and supported to prevent undue deflection, vibration, dislocation due to seismic events and line pressures, and stresses on piping, equipment, and structures.

C. FLOOR PIPE SUPPORTS

1. Approved Manufacturer and Type:
   a. Grinnell Company, Inc., adjustable pipe saddle support: Figure 264.
   b. Standon Model S92 Saddle Support.
   c. PHD Manufacturing Inc., adjustable pipe saddle support: Figure 876.
   d. Approved Equivalent.
2. Minimum vertical adjustment: 4.5 inches.
3. Provide complete with riser pipe and flange bolts for floor mounting.

D. FINISH

1. Factory coat steel hangers and supports as recommended by manufacturer.
2. Touch up finish on exposed steel hangers and supports in accordance with manufacturer recommendations.

1.03 EXECUTION

A. PIPE HANGERS AND SUPPORTS

1. Support horizontal pipelines within manholes or similar structures with a minimum of 2, 3/8-inch diameter supports. Additional supports may be required at the direction and discretion of the Engineer.

B. PAINTING

1. Prime coat non-galvanized steel hangers and supports.
2. Finish coat all hangers and supports as recommended by manufacturer.

END OF SECTION 40 05 07

SECTION 40 05 35
HIGH-DENSITY POLYETHYLENE PROCESS PIPE

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:
   a. Pipe, fittings, wall pipes, connections, and gauges associated with interior Work.

B. Related section include:

1. Section 40 05 06 - Couplings, Adapters, and Specials for Process Piping.
2. Section 40 05 07 - Hangers and Supports for process piping.
3. Section 40 05 58 - Process Valves.

1.02 QUALITY ASSURANCE

A. Piping modifications subject to Engineer's review. No additional compensation allowed for modifications required to suit equipment furnished by Contractor.

1.03 REFERENCES

A. Reference Standards include:

1. ASTM D1248 - Polyethylene Plastics Molding and Extrusion Materials.
2. ASTM D2239 - Polyethylene (PE) Plastic Pipe (SDR-PR)
3. ASTM D2513 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
4. ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter- Controlled Polyethylene Pipe and Tubing.
5. ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing.
6. ASTM D2774 Standard Practice for Underground Installation of Thermoplastic Pressure Piping.
7. ASTM D3035 - Polyehtylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
8. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
9. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
10. ASTM D3350 - Polyethylene (PE) Plastic Pipe and Fitting Materials.
11. ASTM F477 - Elastomeric Seals (Gaskets) for Joing Plastic Pipe.
12. ASTM F 905 Standard Practice for Qualification of Polyethylene Saddle-Fused Joints.
13. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe.

14. ASTM F1290 Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings.
15. ASTM F 2164 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
16. ASTM F 2206 Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE) Plastic Pipe, Fittings, Sheet Stock, Plate Stock, or Block Stock.
17. ASTM F2620 ASTM F 2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.
18. ASTM F 3124 Standard Practice for Data Recording the Procedure Used to Produce Heat Butt Fusion Joints.
19. ASTM F 3183 Standard Practice for Guided Side Bend Evaluation of Polyethylene Pipe Butt Fusion Joint.
20. ASTM C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 1/2-inch through 3-inch, for Water.
21. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 in. through 63 in., for Water Distribution.
22. AWWA C651-05: Standard for Disinfecting Water Mains.
23. AWWA C653-03: Disinfection of Water Treatment Plants.
24. AWWA M55 Manual of Water Supply Practices, PE Pipe–Design and Installation.
25. Pipe in Nominal Pipe Sizes 3⁄4 in. to 65 in.
26. PPI Handbook of Polyethylene Pipe – 2009 (2ndEdition).
27. PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE) Pipe.
28. PPI Material Handling Guide for HDPE Pipe and Fittings.
29. PPI TR-33 Generic Butt Fusion Joining Procedure for Polyethylene Gas Pipe.
30. PPI TR-34 Disinfection of Newly Constructed Polyethylene Water Mains.
31. PPI TR-38 Bolt Torque for Polyethylene Flanged Joints.
32. PPI TR-41 Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping.
33. PPI TN-42 Recommended Minimum Training Guidelines for PE Pipe Butt Fusion Joining Operators.
34. NSF Standards No. 60 and 61: National Sanitation Foundation.

1.04 SUBMITTALS

A. Submit Shop Drawings in accordance with Section 01 33 00 - Submittal Procedures for all pipe and fittings indicating: Name of Manufacturer, Materials, Standard Dimensions, References, and Joint Data.

1.05 PAINTING AND IDENTIFICATION SYSTEMS

A. Finish painting of all materials and equipment in this Section shall be the responsibility of the Contractor, and shall be as recommended by manufacturer of equipment to be painted, unless otherwise specifically indicated.

1.06 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

PRODUCTS

2.01 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Materials: All material shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D 3350. HDPE pipe and fittings shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. HDPE products shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

B. HDPE Pipe

1. Pipe shall be made of HDPE material with a minimum material designation code of PE4710. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black of not less than 2 percent. The manufacture of the HDPE resin shall certify the cell classification indicated.
2. Pipe sizes 3” and larger shall have a manufacturing standard of ASTM F714, while pipe smaller than 3” shall be manufactured to the dimensional requirements listed in ASTM D3035. Dimension Ratio (DR) and Outside Diameter (IPS/DIPS) shall be as specified on plans.
3. Pipe shall meet AWWA C901 (1/2” to 3”) or AWWA C906 (4” to 63”) and shall be listed as meeting NSF 61.
4. Pipe shall be manufactured by an ISO 9001 certified manufacturer. The pipe manufacturer shall have an ongoing Quality Control program for incoming and outgoing materials and shall assure that the pipe will meet the material requirements of this specification. HDPE resins for manufacturing of pipe shall be checked for density, melt flow rate, and contamination. The facility shall have the necessary testing equipment to verify that pipe meets the AWWA and NSF standards. Pipe shall be checked for outside diameter, wall thickness, length, and surface finish on the inside and outside. The Manufacturer’s production facilities shall be open for inspection by the Owner or Engineer.

C. HDPE Fittings

1. Butt Fusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE4710 and with a minimum Cell Classification as noted in 2.01.A. Fittings shall have a minimum pressure rating equal to or greater than the pipe to which they are joined unless

otherwise specified on the plans or accepted by owner/engineer. All fittings shall meet the requirements of AWWA C901 or AWWA C906.

a. Molded fittings shall comply with the requirements of ASTM D3261.

b. All fabricated elbows, tees, reducing tees and end caps shall be produced and meet the requirements of ASTM F 2206. Each fitting will be marked per ASTM F 2206 section 10 including the nominal size and fitting EDR, which will meet or exceed the pipe DR identified for the project.

2. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 4710. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a minimum pressure rating equal to or greater than the pipe to which they are joined unless otherwise specified on the plans. For potable water systems, all electrofusion fittings shall have AWWA approval.

3. Bolted Connections – Flanged and Mechanical Joint Adapters can be made to ASTM D 3261 or if machined, must meet the requirements of ASTM F 2206. Flanges and MJ Adapters shall be fused onto the pipe and have a minimum pressure rating equal to or greater than the pipe unless otherwise specified on the plans.

a. Flange Adapters shall meet the dimensional and material requirements of ASTM F2880.

b. Metallic back-up rings (Van-Stone style lap joint flanges), shall have a radius on the inside diameter of the bore so as to be compatible with HDPE Flanges. Back up rings shall have bolt pattern that will mate with AWWA C207 Class D (or B or E), ASME/ANSI B 16.5 Class 150, ASME/ANSI B 16.1 Class 125, or ASME/ANSI B16.47 Series A.

c. Flange assemblies shall be assembled and torqued according to PPI TN-38, “Bolt Torque for Polyethylene Flanged Joints.”

d. Where shown on the drawings, 4" and larger transitions to mechanical joint fittings and valves shall be accomplished using a MJ Adapter with kit. The D.I./HDPE mechanical joint adaptor shall consist of:

1) A molded or fabricated HDPE mechanical joint transition fitting.
2) A rubber gasket.
3) A mechanical joint backup drive ring.
4) Corten mechanical joint tee bolts.

D. Fusion Unit Requirements

1. All Fusion Equipment, whether new or used, rented or owned, shall comply with the requirements of ISO 12176-1 “Equipment for Fusion Jointing Polyethylene Systems”.

2. Butt fusion equipment must be in satisfactory working order and the hydraulic system must be leak free. Heater plates shall be free from scrapes, gouges, and have a consistent clean coated surface. The pressure gage and thermometer should be checked for accuracy. When requested by the owner, records showing a maintenance service/inspection within 3 months prior to use for this project shall be

provided.

3. Electrofusion Processors shall be maintained and calibrated per manufacturer’s requirements and recommendations.

EXECUTION

3.01 GENERAL

A. All HDPE pipe and fittings shall be cut, joined, and installed in accordance with the manufacturer's recommendations. Joining, laying, and pulling of polyethylene pipe shall be accomplished by personnel experienced in working with polyethylene pipe systems.

3.02 TRANSPORTATION, UNLOADING, AND STORAGE

A. The manufacturer shall package product in a manner designed to deliver the pipe and fittings to the project neatly, intact and without physical damage. During transportation each pipe shall rest on suitable pads, strips skids, or blocks securely wedged or tied in place.

B. During loading, transportation, and unloading, every precaution should be taken to prevent damage to the pipe. The handling of the pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Cuts or gouges that reduce the wall thickness by more than 10% are not acceptable and must be cut out and discarded.

C. Handle the pipe in accordance with the PPI Handbook of Polyethylene Pipe (2nd Edition), Chapter 2 .All pipe and accessories shall be loaded and unloaded by lifting with hoists or by skidding in order to avoid shock or damage. Under no circumstances shall materials be dropped. Pipe handled on skidways shall not be rolled or skidded against pipe on the ground. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior surface or interior of the pipe. All pipe and fittings shall be subjected to visual inspection at time of delivery and before they are lowered into the trench to be laid.

D. Materials, if stored, shall be kept safe from damage and shall not be stacked higher than the limits recommended by the manufacturer. The bottom tiers shall be kept off the ground on timbers, rails, or concrete. Pipe shall not be stored close to heat sources. The contractor shall be responsible for all security, damage and loss of pipe.

E. The interior of the pipe as well as all sealing surfaces of mating components (i.e. flange faces) shall be kept free from dirt or foreign matter at all times. The open ends of all sections of joined and/or installed pipe (not in service) shall be plugged to prevent insects, animals, or foreign material from entering the pipeline or pipe section. The practice of stuffing cloth or paper in the open ends of the pipe will not be permitted. Use waterproof nightcaps to prevent the entrance of any type of natural precipitation into the carrier or containment pipe and will be secured to the pipe in such a manner that the wind cannot blow them loose.

Where possible, the pipe shall be raised and supported at a suitable distance from the open end such that the open end will be below the level of the pipe at the point of support.

3.03 RECEIPT INSPECTION

A. All pipe and fittings shall be subjected to visual inspection at time of delivery and before they are installed or lowered into the trench to be laid. Defective, damaged, or unsound pipe will be rejected. Cuts, punctures, or gouges that penetrate or reduce the wall thickness by 10% or more are not acceptable and must be removed and discarded. Joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor.

3.04 FUSION AND JOINING

A. All HDPE pipe shall be joined to itself by the heat fusion process which produces homogeneous, seal, leak tight joints. Tie-ins between sections of HDPE pipe shall be made by butt fusion whenever possible.

B. Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F2620 or PPI TR-33. All fusion joints shall be made in compliance with the pipe or fitting manufacturer's recommendations. Fusion joints shall be made by qualified fusion technicians per PPI TN-42. A record or certificate of training for the fusion operator must be provided that documents training to the fundamentals of ASTM F2620. Considerations should be given to and provisions made for adverse weather conditions, such as temperatures below freezing, precipitation, or wind, which is accepted by the owner/engineer.

C. Electrofusion: Electrofusion joining shall be done in accordance with the manufacturers recommended procedure. Other sources of electrofusion joining information are ASTM F1290, PPI TN 34, and PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE) Pipe. The process of electrofusion requires an electric source, commonly called an electrofusion processor that has wire leads and a method to read electronically (by laser) or otherwise input the barcode of the fitting. The electrofusion processor must be capable of reading and storing the input parameters and the fusion results for later download to a record file. Qualification of the fusion technician shall be demonstrated by evidence electrofusion training within the past year on the equipment to be utilized for this project.

3.05 FUSION OPERATORS

A. The employer of the fusion machine operator is responsible for the fusion joint quality of the fusion weld made by that individual. The employer is responsible for documenting all training and qualification records for that individual, including compliance to any code requirements for fusion/bonder operators.

B. All HDPE fusion equipment operators shall be qualified to the procedure used to perform pipe joining. Fusion equipment operators shall have current, formal training on all fusion equipment employed on the project. Training received more than two years prior to operation with no evidence of activity within the past 6 months shall not be considered current.

3.06 BUTT FUSION EQUIPMENT

A. For 6” and larger pipe sizes, the pipe butt fusion machine shall be a self-contained hydraulic fusion machine capable of butt fusing HDPE pipe. The carriage must be removable from the chassis for in-ditch use. The machine must be compatible with an electronic data recording device. Accessories will include all butt fusion inserts for the specified range of pipe sizes, a pyrometer kit for checking the surface temperature of the heater, extension cord of appropriate gauge (25' minimum), and hydraulic extension hoses (minimum of four).

B. In areas where there may be insufficient space to lay out the entire length of fused pipe to be pulled-back, the Contractor shall utilize a continuous HDPE pipe fusion equipment such as a PolyHorse by McElroy or other means in order to fuse the length of pipe necessary for the installation. The Contractor shall be responsible for securing and obtaining permission/permits from adjacent property if necessary, for staging and/or fusing of the pipe and HDD equipment at no additional cost to the Owner.

3.07 BUTT FUSION EXAMINATION AND TESTING

A. Examinations

1. Visual: For pipe sections, examine the full exterior circumference for bead uniformity before cutting. After cutting the pipe section, review the interior bead. All beads should have visually acceptable bead formation as shown in Fig 4 and Appendix X2 of ASTM F2620. In addition, the following characteristics are expected:
    a. There shall be no evidence of cracks or incomplete fusing.
    b. There shall be no evidence of captured objects (e.g., pipe shavings, facer ribbons) between bonded surfaces.
    c. Variations in upset bead heights on opposite sides of the cleavage and around the circumference of fused pipe joints are acceptable.
    d. The apex of the cleavage between the upset beads of the fused joint shall remain above the base material surface.
    e. Fused joints shall not display visible angular misalignment, and outside diameter mismatch shall be less than 10% of the nominal wall thickness
    f. Fusion data record review that meet criteria of section 3.04.D.1 can be used as additional verification of visual indicators.
2. Fusion Data Record Review
3. The fusion date record for each fused joint shall be compared to the approved fusion procedure. The reviewer shall verify the following:
    1) That all data required by section 3.04.D.1 was recorded.
    2) Interfacial pressure was within the acceptable range.

3) Heater surface temperature was within the acceptable range.
4) Butt fusion pressure applied during the fusing/cool cycle was correctly calculated to include drag pressure, fell within the acceptable range for the applicable size and agrees with the recorded hydraulic fusing pressure.
5) Butt fusing pressure was reduced to a value less than or equal to drag pressure at the beginning of the heat soak cycle.
6) Fusing machine was opened at the end of the heat soak cycle, the heater was removed, and the end were brought together at the fusion pressure with the acceptable time range.
7) Cooling time at butt fusing pressure met the minimum time specified.

4. If the recorded data in section 3.04.D.1 is outside the limits of the acceptable range, the joint is unacceptable, and must be removed and replaced.
5. Frequency. Records for test fusion joints should be reviewed immediately after the joint is completed. Fusion joints for jobsite fusions should be reviewed daily or before being covered with backfill.

B. Mechanical Tests

1. Contractor shall mechanically test the first fusion of each operator and each machine used on the project. Installation shall not continue until a fusion test has passed the test. Additional mechanical test are not required as long as long as the fusion are reviewed with the frequency specified in section 3.04.E.1.iv. Testing of fusion joints with no fusion data record review shall be at a frequency specified by the Owner or Engineer.
2. The fusion shall be allowed to cool completely; then fusion test straps shall be cut out.
3. All samples shall be labeled with operator information. Testing must be done at 73 degrees F plus or minus 5 degrees. The test temperature and sample size are critical to testing. Testing performed at cold or elevated temperatures may not give similar results to tests performed at ambient temperatures.
4. Each pipe sample weld shall be subjected to testing at two locations 180 degrees apart from each other in the joint weld. All specimens shall be tested by one of the following methods:
   a. Reverse Bend Test are allowed for pipe sizes 4” IPS or smaller. The specimens shall be prepared and tested in accordance with ASTM F2620, Appendix X4.
   b. Guided Side Bend Test are allowed for all wall thicknesses of 1” or greater. The specimens shall be removed and tested in accordance with ASTM F 3183.
   c. Hydrostatic Burst Test is allowed for pipe sizes 2”-24”. The specimen length should measure 6 times pipe diameter with the butt fusion joint in the center of the specimen. The specimen should be tested in a tank filled with water, and testing conditions

monitored and recorded with computerized equipment. The specimen will be tested at 4 times pipe rated pressure for 5 minutes with no failure of joint allowed.

5. Results of any mechanical test should be documented. Information on the weld and operator should be transferred from the sample to the testing record.

3.08 TESTING

A. Hydrostatically test each entire line in accordance with AWWA C600.

B. Subject each entire line to a leakage and hydrostatic pressure test for a period of two hours at a minimum pressure of 1.5 times or 50 psi greater than the normal working pressure of the installed line, whichever is greater, but not greater than the pressure rating of the pipe.

C. All joints shall be watertight and free from leaks. All leaks shall be repaired by and at the expense of the Contractor.

3.09 DISINFECTION

A. Disinfect process and miscellaneous water piping accordance with AWWA C651 and AWWA C653.

END OF SECTION 40 05 35

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SECTION 40 05 58
PROCESS VALVES

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing and installation of the following, in accordance with the provisions of the Contract Documents.
   a. Globe Check Valves.

B. Related Sections Include:

1. Section 40 05 06 - Couplings, Adapters, and Specials for Process Piping.
2. Section 40 05 07 - Hangers and Supports for process piping.
3. Section 40 05 33 – High-Density Polyethylene Process Pipe.

C. Reference Standards Include:

1. AWWA C504: Rubber-Seated Butterfly Valves.
2. ANSI/AWWA C507: Ball Valves, 6 In. Through 60 In.
3. AWWA C509: Resilient-Seated Gate Valves for Water Supply Service: 2 inches through 24 inches NPS.
4. AWWA C512: Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
5. AWWA C515: Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
6. ANSI/AWWA C541: Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
7. ANSI/AWWA C542: Electric Motor Actuators for Valves and Slide Gates.
8. AWWA C550: Protective Epoxy Interior Coatings for Valves and Hydrants.
9. ANSI/AWWA C561: Fabricated Stainless Steel Slide Gates.
10. ANSI/AWWA C563: Fabricated Composite Slide Gates.
11. ASTM D1784: Rigid Polyvinyl Chloride Compounds and Chlorinated Polyvinyl Chloride Compounds.
12. ASTM D2464: Threaded Polyvinyl Chloride Plastic Pipe Fittings, Schedule 80.
13. ASTM F437: Threaded Chlorinated Polyvinyl Chloride Plastic Pipe Fittings, Schedule 80.
14. ASTM A351 CF8M: Standard Specification for Castings, Austenitic, for Pressure-Containing Parts
15. ANSI B16.5: American National Standard Pipe Flanges and Flanged Fittings.
16. Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc. Standard Practice 67.

1.02 SHOP DRAWINGS AND PRODUCT DATA:

A. Shop Drawings and Product Data shall be submitted in accordance with specification Section 01 33 00 - Submittal Procedures 01 33 00.

B. Operations and Maintenance Data shall be submitted in accordance with specification Section 01 78 23 - Operation and Maintenance Data.

1.03 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

PRODUCTS

2.01 GENERAL

A. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

B. The tag number designated by the Engineer, as indicated in the Process Schedules, shall be stamped on a corrosion-resistant plate attached to both the actuator and valve.

C. Unless otherwise indicated, use valves suitable for 150 psi minimum working pressure.

D. Valve Operators, as shown on Drawings or as specified.

E. Valve materials shall be compatible with the liquid or chemical service for that particular valve and consistent with piping materials. Contractor shall submit valve service to Owner and Engineer for confirmation of chemical compatibility.

F. A valve schedule is provided for specific specialty valves within this Specification. The Engineer does not warrant the accuracy of valves, operators, locations, connections, or other requirements. Contractor shall verify all valve sizes and requirements with the Drawings and Specifications and notify the Engineer of any discrepancies.

2.02 VALVE CONNECTIONS

A. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use full port size valves, unless otherwise specified.

B. Thread pipe sizes 1-1/2 inches and smaller unless indicated otherwise.

C. Flange pipe sizes 2 inches and larger unless indicated otherwise.

2.03 CHECK VALVES

A. Globe Check Valve:

1. Approved Manufacturer and type:
   a. Cal-Val

b. Crispin RF Series
c. Valmatic Series 500
d. Approved Equivalent.

B. Design:

1. Globe design or Flapper/Swing Design
   a. Body and cover: Dusctile iron or copper alloy C87600 lead-free bronze conforming to ASTM A536 and AWWA C-508.
   b. Disc: Buna-N Rubber.
   c. Diaphragm: Nylon Reinforced Buna-N Rubber.
   d. Disc retainer and diaphragm washer: Cast iron.
   e. Disc Guide, Seat, & Cover Bearing: Stainless Steel.
   f. Stem, Nut, and Spring: Stainless steel.
2. End connections: female threaded NPT ends or flanged according to ANSI/AWWA C110/A21.10.
3. Pressure Rating: 150# Class for 200 psi or greater working pressure.
4. Flow Area Through Body: Equal to or greater than area of equivalent size pipe.
5. Exterior Paint: Phenolic primer red oxide, FDA approved for potable water contract.
6. Valve disc shall absolutely prevent the return of water back through the valve when inlet pressure decreases below the delivery pressure, on pump shutoff or power failure.
7. Valve shall be tight-seating.
8. Shall be cycle tested in accordance with ANSI/AWWA C508.

2.04 EXECUTION

A. INSTALLATION

1. Install valves with stems upright or horizontal, not inverted.
2. Install valves in the locations shown on Drawings. Verify configuration with Owner and Engineer.
3. Provide adequate structural support of installed valves as required.
4. Install valves per manufacturer’s recommendations.
5. Valve tags to be installed so as not to interfere with valve operation.

END OF SECTION 40 05 58

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SECTION 40 70 01
INSTRUMENTATION GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Related sections include but are not limited to:

1. Section 01 33 00 - Submittal Procedures
2. Section 01 78 23 - Operation and Maintenance Data
3. Section 26 05 19 - Power And Instrumentation Cable - Less Than 600V
4. Section 26 05 34 - Conduit
5. Section 26 05 37 - Boxes
6. Section 26 05 53 - Identification For Electrical Systems

1.02 REFERENCES

A. Reference Standards:

1. National Fire Protection Association (NFPA) 70 - National Electrical Code (NEC)
2. National Electrical Manufacturers Association (NEMA)
   a. NEMA ICS-2 - Industrial Control Devices, Controllers and Assemblies
   b. NEMA 250 - Enclosures for Electrical Equipment
3. Underwriters Laboratories (UL) - 508 Industrial Control Equipment

1.03 SCOPE

A. It is the intent of the Contract Documents that all equipment specified in this Section of the specification be supplied by the same single-source supplier (“Systems Integrator”) specified in Section 40 63 13 - Process Control Panels and Hardware unless noted otherwise herein or on engineer's drawings. The supplier shall assume full responsibility along with the Contractor for furnishing, installing and start-up procedures so as to make the system operate per the intent of the Contract Documents.

B. The Work specified in this Section includes furnishing, installing, start-up, testing and adjusting of all required equipment, including instruments, equipment, hardware, software, wiring, accessory equipment, and training to provide a completely operational process instrumentation and control system.

C. It shall be the responsibility of the Contractor to furnish a complete and fully operating system. The Contractor shall be responsible for all details that may be necessary to properly install, adjust and place in operation the complete installation. The Contractor shall assume full responsibility for additional costs that may result from unauthorized deviations from the Contract Documents.

D. It shall be the responsibility of the Contractor and supplier to examine all new equipment that is transmitting a signal to, or receiving a signal from, equipment specified in this Section. The Contractor shall be responsible for providing signal

converters, buffer amplifiers, and isolation devices to make signal levels, reference to ground, etc. compatible between devices specified in this Section and existing equipment.

1.04 SUBMITTALS

A. All submittal requirements stated herein shall be in addition to those outlines section 01 33 00 - Submittal Procedures.

B. Shop Drawings:

1. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Equipment catalog cut sheets.
   c. Instrument data sheets:
      1) ISA S20 or approved equal.
      2) Separate data sheet for each instrument type.
   d. Materials of construction.
   e. Minimum and maximum flow ranges.
   f. Pressure loss curves.
   g. Physical limits of components including temperature and pressure limits.
2. Provide a parameter setting summary sheet for each field configurable device.
3. Certifications:
   a. Documentation verifying that calibration equipment is certified with NIST traceability.
   b. Approvals from independent testing laboratories or approval agencies, such as UL, FM or CSA.
      1) Certification documentation is required for all equipment for which the specifications require independent agency approval.

C. Technical data in conformance with Section 01 33 00 - Submittal Procedures and including:

1. All equipment and components indicated on the Drawings and specified in Part 2 of this Section
2. Junction Box Enclosures

D. Shop Drawings in conformance with Section 01 33 00 - Submittal Procedures and including:

1. Control panel and junction box drawings including system schematic drawings, terminal numbering, component schematic drawings, dimension drawings, layout drawing and nameplate schedule. Where panels, junction boxes and new Owner-furnished equipment is being utilized, the submittal shall include complete schematics showing all proposed equipment, terminals, terminal numbering, wiring, elevations, and details. It shall be the supplier’s responsibility to visit the Site and inspect existing and Owner-furnished equipment to prepare complete system drawings for the Project.

2. Overall system diagram showing all components, converters, cables, and connectors.

E. Manufacturer’s Instructions

1. Furnish under provisions of Section 01 78 23 - Operation and Maintenance Data.

F. Manufacturer’s Field Service Reports

1. Furnish under provisions of Section 01 78 23 - Operation and Maintenance Data. Reports should cover a minimum of startup, demonstration, and operational instructions.

G. Operation and Maintenance data in conformance with Section 01 78 23 - Operation and Maintenance Data and including:

1. Panel equipment, junction boxes, field devices and instruments, including "as-built" system schematics. All items requested under Part 2 below should be included in their “as-built” form.

H. Spare Equipment Lists - Provide a list of recommended spare parts and equipment that is considered essential to the operation of the system. Include list of current prices for each item. These lists may be included with the Operation and Maintenance data submittals.

I. All submittals shall be searchable documents in PDF file type. They shall be electronically delivered through the platform/method all parties mutually agreed upon. The submittal shall be broken up into sections and bookmarked to allow for easier navigation throughout the submittal.

1.05 CIRCUIT IDENTIFICATION

A. Each power, control, and signal conductor shall be identified by plastic tags permanently attached to the cable. The tags shall be attached to each cable at each termination and wherever the cable is accessible in junction or pull boxes. Tags shall be marked with printing showing:

1. The circuit number from the cable and conduit schedules.
2. The terminal number as assigned by the equipment manufacturer.

B. The cable marking system shall use transparent tape with a white area where the numbering shall be typed using a typewriter or computer, as manufactured by:

1. Raychem
2. Thomas & Betts
3. Brady

C. Contractor supplied “as-built” schematics and wiring diagrams should reflect this described wire identification.

1.06 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National

Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

PART 2 PRODUCTS

2.01 REFER TO THE FOLLOWING PRODUCT SECTIONS

A. Flow Measurement - See Section 40 71 00

B. Level Measurement - See Section 40 72 00

C. Pressure, Strain, and Force Measurement - See Section 40 73 00

D. Temperature Measurement - See Section 40 74 00

PART 3 EXECUTION

3.01 LABELING

A. Label all field mounted control devices, instrumentation, switches, etc., with tag number (if applicable) and item description.

B. Labels shall be engraved laminated plastic with 1/4" high lettering. Labels shall be attached with stainless steel screws to the device or nearby wall.

3.02 CALIBRATION, ADJUSTING AND TESTING

A. Devices requiring field calibration shall be calibrated in the presence of the Engineer's representative and documented.

3.03 PROJECT MANAGEMENT

A. Supplier shall provide engineering and administrative services necessary to fulfill the requirements of this Specification.

B. Supplier shall provide the services of an experienced project manager as the overall coordinator during the course of the project.

3.04 FIELD QUALITY CONTROL

A. Maintain accurate daily log of all startup activities, calibration functions, and final setpoint adjustments.

B. Instrumentation Calibration:

1. Verify and document that all instruments and control devices are calibrated to provide the performance required by the Contract Documents.
   a. Utilize the Instrument Certification Sheet located at the end of this Specification Section (or Engineer approved equivalent) to document on-site calibration checks.
2. Factory furnished calibration certifications are acceptable for the following:

a. Flow meters.
b. Pressure sensors utilized with annular sleeve.
c. Temperature sensors.

3. On-site calibration verification is required for all other instruments, including “smart” transmitters that have been factory calibrated.
   a. Provide calibration checks at 0 PCT, 25 PCT, 50 PCT, 75 PCT and 100 PCT of span for pressure transmitters and gages.
      1) Check for both increasing and decreasing input signals to detect hysteresis.
   b. In addition to factory calibration certification, temperature sensors and gages shall be checked at a single point for conformance to required accuracy.
   c. Level transducers/transmitters shall be checked at two points in addition to zero.
   d. Analytical sensors shall be calibrated in accordance with manufacturer’s recommendations.
   e. Check operation of all switches to verify actuation occurs in accordance with manufacturer’s specified accuracy.
   f. Replace any instrument which cannot be properly adjusted.
   g. Stroke pneumatic control valves with clean dry air to verify control action, positioner settings, and solenoid functions.
4. Calibration equipment shall be certified by an independent agency with traceability to NIST.
   a. Certification shall be up-to-date.
   b. Use of equipment with expired certifications shall not be permitted.
5. Calibration equipment shall be at least three times more accurate as the device being calibrated.

C. Loop Check-Out Requirements are as Follows:

1. Work closely with the Owner to check control signal generation, transmission, reception and response for all control loops under simulated operating conditions by imposing a signal on the loop at the instrument connections. Loop check-out work shall verify proper operation of the installed equipment and the Owner’s PLC and HMI programming.
   a. Use actual signals where available.
   b. Closely observe controllers, indicators, transmitters, HMI displays, recorders, alarm and trip units, remote setpoints, ratio systems, and other control components.
      1) Verify that readings at all loop components are in agreement.
      2) Make corrections as required.
         (a) Following any corrections, retest the loop as before.
2. Stroke all control valves, cylinders, drives and connecting linkages from the local control station and from the control room operator interface.
3. Check all interlocks to the maximum extent possible.
4. Utilize the Loop Check-Out Sheet located at the end of this Specification Section (or Engineer approved equivalent) to document on-site calibration checks.
5. In addition to any other As-Recorded Documents, record all setpoint and calibration changes on all affected Contract Documents and turn over to

the Owner.

3.05 FIELD QUALITY CONTROL - INSTALL, START-UP AND WITNESS TESTING

A. Contractor shall furnish and install raceway and wiring systems for the instrumentation and control system in accordance with manufacturer's requirements and in accordance with Sections 26 05 34 - Conduit. All instrumentation and control system raceways shall be galvanized rigid steel conduit unless specifically indicated otherwise.

B. Supplier shall provide a skilled programmer/instrumentation engineer or technician who shall complete troubleshooting and start-up to place the entire system into satisfactory operation. The engineer or technician shall make the necessary inspection of the completed installation, make the necessary final field adjustments, and make program revisions as required for start-up.

C. Coordinate installation, start-up and testing scheduling with Owner and Engineer.

D. Instruct Owner's personnel at the Site on the operation and maintenance of equipment furnished in this Section.

E. Furnish Owner and Engineer with a written report prepared by Supplier certifying that equipment:

1. Has been properly installed.
2. Is in accurate alignment and calibration and is free from undue stress imposed by interconnecting cable/conduit, etc.
3. Has been operated and witness demonstrated to the Owner under expected conditions and that it operates satisfactorily.

3.06 ON-SITE SERVICES

A. In addition to other services specified, provide a competent instrumentation engineer or technician to perform the following services:

1. Training – two (2), eight (8) hour days on-Site to train Owner's personnel on operation and maintenance of all equipment furnished under this Section.

B. All on-Site service shall be at times approved by the Owner.

END OF SECTION 40 70 01

SECTION 40 71 13
MAGNETIC FLOW METERS

GENERAL

1.01 SUMMARY

A. Section includes:

1. Furnishing and installation of the following, in accordance with the provisions of the Contract Documents.
   a. Magnetic Flow Meters and Transmitters.

B. Related Sections include:

1. Section 01 33 00 - Submittal Procedures.
2. Section 01 45 00 - Quality Control.
3. Section 01 61 00 - Common Product Requirements.
4. Section 01 75 00 - Starting and Adjusting.
5. Section 01 77 00 - Closeout Procedures.
6. Section 01 78 23 - Operation and Maintenance Data.
7. Division 40 – Process Interconnections.

1.02 REFERENCES

A. Reference Standards include

1. AWWA C701: Standard for Cold Water Meters.

1.03 SUBMITTALS

A. Shop Drawings and Product Data: Submit in accordance with Section 01 33 00 - Submittal Procedures, detailed specifications, drawings and data covering all materials, parts, devices, equipment, cabling length and requirements, and other accessories forming part of equipment for each complete operational system.

B. Operations and Maintenance Data: Submit in accordance with Section 01 78 23 - Operation and Maintenance Data on all parts, devices, equipment, and other accessories forming the complete operational system.

1.04 REGULATORY REQUIREMENTS

A. All Products that may come into contact with water intended for use in a Public Water System shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A Product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each Product.

1.05 WARRANTY REQUIREMENTS

A. The meter manufacturer/supplier shall warrant the units being supplied to the Owner against defects in workmanship and materials for a period of one (1) year, from the date of installation, under normal use, operation and service. The

warranty shall be in printed form. No prorated warranty will be accepted.

PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Magnetic Flow Meters and Transmitters

1. Rosemount, by Emerson
   a. Model: 8705W
2. Prior Approved Equivalent.

2.02 CONNECTIONS

A. Provide flanged meters suitable to connect to adjoining piping as specified for pipe fittings.

B. Electrical connection shall be by the Electrical Contractor.

2.03 WORKING PRESSURE

A. Working pressure of meters equal to working pressure of connecting pipes.

2.04 MAGNETIC FLOW METERS

A. Manufactured Units:

1. Accuracy:
   a. +/- 1.0%
2. Designed for operation on battery.
3. Metering tube:
   a. Welded steel, epoxy coated
   b. Mount directly in the pipe between ANSI Class 150 flanges.
4. Interior lining:
   a. 2, 3, and 8-inch: Polyurethane
5. Electrodes:
   a. 316 Stainless Steel
6. Electronic housing:
   a. Powder coated diecast aluminum
7. Grounding Rings:
   a. User installed.
8. Communication:
   a. Serial
9. Display:
   a. Integrated

B. The converters shall be provided with a backlit, dot matrix type, liquid crystal display for easy reading of flow and configuration data. For configuration adjustment and system monitoring all database parameters and error messages shall appear in the display in plain English language. Error messages shall announce incorrect entry values which will be rejected by the computer.

C. The meters shall be hydraulically calibrated at a facility located in the United States and the calibration shall be traceable to the National Bureau of

Standards. Computer printouts of the actual calibration data giving indicated versus actual flows at a minimum of three (3) flow rates shall be provided with the meters. The accuracy of the metering system shall be 1% of rate from low flow cutoff to maximum flow rate of 10 meters per second.

D. Complete zero stability shall be an inherent characteristic of the meter systems. This shall eliminate the need to zero adjust the system with a full pipe at zero flow.

E. Metering tube and housing shall be factory primed and finish coated with manufacturer's standard coating system.

F. All meters shall be capable of withstanding accidental submergence.

G. Meter Schedule:

Reservoir Site	Mag Meter Size (in)	Mag Meter Quantity	Transmitter Type
Webster PRV Manhole	2	1	Tube mount

EXECUTION

3.01 INSTALLATION

A. Meters to be installed in accordance with manufacturer's recommendations.

B. Position registers to read from left to right when installed in vertical position.

3.02 PAINTING

A. Provide manufacturer's standard coating.

B. Meter flow tubes, remote readouts/converters, and bronze maincases will not be painted.

END OF SECTION 40 71 13

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SECTION 40 72 00
LEVEL MEASUREMENT

PART 1 GENERAL

1.01 REFER TO PART 1 GENERAL OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS .

PART 2 PRODUCTS

2.01 FLOOD SWITCH

A. General Specifications

1. Electrical
   a. Two wire termination
   b. SPST contacts
   c. 120VAC 20VA rated
2. Nominal Operating Differential: 1-3/8"
3. Manufacturer supplied extra flexible cord of sufficient length to reach junction box as indicated on plans with waterproof connection to sensor

B. Schedule

1. Flood Float Switches shall be furnished and installed for the following application(s):
   a. WBV-FLS-052

C. Manufacturer/Model

1. Gem Sensors LS-270 Series – P/N: 43760
2. Prior Approved Equal

PART 3 EXECUTION

3.01 REFER TO PART 3 EXECUTION OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

END OF SECTION 40 72 00

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SECTION 40 73 00
PRESSURE MEASUREMENT

PART 1 GENERAL

1.01 REFER TO PART 1 GENERAL OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS .

PART 2 PRODUCTS

2.01 PRESSURE TRANSDUCER - STANDARD

A. General Specifications

1. Housing Material: Aluminum
2. Input Voltage: 10.5-42.5 VDC Loop Powered
3. Output Signal: Two (2) Wire 4-20mA HART
4. Display/Interface: LCD Display with full Local Operator Interface
5. Configuration Buttons: Analog Zero and Span
6. Diaphragm Type: Isolated
7. Diaphragm Fill Fluid: Silicone
8. Diaphragm Material: 316L SS
9. Accuracy (Min): +/- 0.075% of Calibrated Span
10. Long term stability (Min): +/-0.15% of URL or better
11. Turndown: 10:1 or better
12. Sensing Range: Refer to IO Schedule
13. Temperature Ratings: -40-190°F
14. Process Connection (Application Dependent): 1/2" NPT

B. Approvals

1. NSF Drinking Water

C. Schedule

1. Pressure Transducers shall be furnished and installed for the following application(s):

D. Manufacturer/Model

1. Endress+Hauser Cerabar S PMP71
2. Rosemount 2088G
3. Prior Approved Equal

PART 3 EXECUTION

3.01 REFER TO PART 3 EXECUTION OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

END OF SECTION 40 73 00

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SECTION 40 73 13
PRESSURE AND DIFFERENTIAL PRESSURE GAUGES

GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing and installation of the following, as indicated, in accordance with the provision of the Contract Documents:
   a. Pressure Gauges / Transmitters.
   b. Stopcocks, Pressure Impulse Dampeners, and Filter Snubbers.

B. Related Sections include:

1. Section 01 33 00 - Submittal Procedures 1 33 00 – Submittal Procedures.
2. Section 01 45 00 - Quality Control.
3. Section 01 61 00 - Common Product Requirements.
4. Section 01 75 00 - Starting and Adjusting.
5. Section 01 77 00 - Closeout Procedures.
6. Section 01 78 23 - Operation and Maintenance Data.
7. Section 01 79 00 - Demonstration and Training.
8. Section 40 05 06 - Couplings, Adapters, and Specials for Process Piping.
9. Section 40 05 33 – High-Density Polyethylene Process Pipe.

1.02 SUBMITTALS

A. Shop Drawings and Product Data shall be submitted in accordance with specification Section 01 33 00 - Submittal Procedures and shall include detailed specifications, drawings, and data covering all materials, parts, devices, equipment, and other accessories forming part of equipment for the complete operational system.

B. Operations and Maintenance Data shall be submitted in accordance with specification Section 01 78 23 - Operation and Maintenance Data.

1.03 QUALITY ASSURANCE

A. The equipment and material to be furnished under this Contract shall be in accordance with Section 01 45 00 - Quality Control and Section 01 61 00 - Common Product Requirements.

1.04 REGULATORY REQUIREMENTS

A. All products that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organization accredited by ANSI to test and certify each product.

1.05 WARRANTY REQUIREMENTS

A. A written warranty shall be provided for the equipment specified in this Section. The warranty shall be for a minimum period identified herein and shall begin from the date of Substantial Completion, as defined in Section 01 77 00. Such warranty shall cover all defects or failures of materials or workmanship that occur as the result of normal operation and service. No prorated warranty will be accepted.

1. Contractor's Warranty: One (1) Year.
2. Manufacturer's Warranty: Minimum of one (1) year but not less than manufacturer's standard warranty period.

PRODUCTS

2.01 WORKING PRESSURE

A. Working pressure of pipe specialties to be equal to working pressure of connecting pipes, unless specified otherwise.

2.02 APPROVED MANUFACTURERS

A. Pressure Transmitters:

1. Keller Preciseline
2. Prior Approved Equivalent

2.03 PRESSURE TRANSMITTERS

A. General:

1. Material: 316L Stainless Steel
2. Pressure Level: Up to 450 PSI
3. Pressure Range: 0 - 200 PSI
4. Accuracy: +/- 0.1% FS
5. Output Type: User Rangeable 4-20 mA + RS485
6. Drinking Water Approval
7. 1/4"-18 NPT Threads
8. Rated for Accidental Submergence

EXECUTION

3.01 INSTALLATION

A. Refer to the Drawings for design details for each installation.

B. Install gauges with shut off cocks in straight runs of piping so that they may be read from floor.

C. Provide extension necks on pressure taps in insulated piping, vessels, and equipment.

D. Provide isolating seal complete with bleed/fill screw where process media are injurious to gauge internals or otherwise required.

E. Install pressure transmitters at all locations indicated on the Drawings.

END OF SECTION 40 73 13

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SECTION 40 74 00
TEMPERATURE MEASUREMENT

PART 1 GENERAL

1.01 REFER TO PART 1 GENERAL OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

PART 2 PRODUCTS

2.01 AMBIENT AIR TEMPERATURE SENSOR/TRANSMITTER

A. Transmitter General Specifications

1. Continuous averaging, 1000 ohm, suitable for wall mounting platinum RTD type temperature sensor
2. Shall be of same manufacturer as the sensor and calibrated for use
3. Electrical Connection: M20 Cable Gland, 2 Wire
4. Power Requirements: 4-20 mA Loop Powered
5. Output Signal: 4-20 mA
6. Operating Range: -40 to 185°F
7. Stainless Steel Tag

B. Sensor General Specifications

1. Accuracy: ± 0.1°C, ± 0.05% of reading
2. Thermal Drift: 0.0025% / °C
3. Response Time: 1 Second (90% Response)
4. Internal Resistance: 1000 Ohms

C. Schedule

1. Temperature sensor and transmitter shall be furnished and installed for the following application(s):
   a. WBV-TT-301

D. Spares

1. Provide one (1) complete spare temperature sensor/transmitter.

E. Manufacturer/Model

1. Omega-EWSA-PT100-TX
2. Endress+Hauser TST434
3. Prior Approved Equal

2.02 AMBIENT AIR TEMPERATURE SWITCH

A. Temperature Switch General Specifications

1. Enclosure Rating: NEMA Type 4X. IP66 and IP68
2. Electrical: 120VAC, Suitable for 24VAC @100mA minimum
3. Switch Action: SPDT
4. Stability: ± 2.5 °F
5. Stainless Steel Tag

B. Schedule

1. See instrumentation schedule in the "Specifications" drawings.

C. Spares

1. Provide one (1) complete spare temperature switches.

D. Manufacturer/Model

1. Chromalox WCRT-100
2. Prior Approved Equal

2.03 TEMPERATURE SENSOR/TRANSMITTER

A. Transmitter General Specifications

1. Stability: ± 0.1% or 0.1 degrees C for 24 months
2. Enclosure Rating: NEMA Type 4X. IP66 and IP68 Rated
3. Electrical Connections: One (1) 1/2" NPT Conduit Entry
4. Electrical: 12 to 42.4 VDC
5. Signal Output: 4-20 mA w/ HART
6. Display: 5-digit LCD w/ 0-100% bar graph
7. Stainless Steel Tag

B. Sensor/Thermowell General Specifications

1. Senor Conformance: IEC 751
2. Accuracy: ± 0.18 deg F ± 0.02% of span
3. Range: -50 to 450 F
4. Stability: ± 0.11%
5. Temperature coefficient: 0.00385 ohm/ohm/degree C
6. Sensor Type: Spring-loaded with Contact Indication
7. Sensor/Immersion Length: As need for each individual application
8. Response time in water @ 3 ft/s (63.2% response): 12 sec
9. Thermowell Material: 316 Stainless Steel
10. Thermowell Style: 3/4"-14 NPT Tapered

C. Transmitter and Sensor shall come pre-assembled.

D. Approvals

1. NSF Drinking Water

E. Schedule

1. Shall be provided for liquid applications.
2. See instrumentation schedule in the "Specifications" drawings.

F. Manufacturer/Model

1. Rosemount – 3144P Series w/ Series 214C RTD

2.04 TEMPERATURE SWITCH - STANDARD OR DIFFERENTIAL

A. Sensor/Transmitter General Specifications

1. Type: Ambient Compensated with Integral Sensor

2. Setpoint Adjustment: Field Adjustable
3. Deadband Adjustment: Field Adjustable
4. Contact Type and Ratings
    a. One (1) DPDT or Two (2) SPDT
    b. 15A at 125VAC and 0.5A at 125VDC
5. Enclosure Rating: Nema 4X 316 SS
6. Temperature Range: As shown on the IO Schedules
7. Process Material: 316 SS
8. Sensor/Immersion Length: As need for each application
9. Conduit Connection: 3/4" NPT
10. Process Connection: 3/4" NPT
11. Thermowell Type: Straight Shank
12. Stainless Steel Tag
13. Chained Cover
14. Switch mounted Indicator Light(s)

B. Schedule

1. Shall be provided for liquid applications.
2. See instrumentation schedule in the "Specifications" drawings.

C. Manufacturer/Model

1. Ashcroft G-Series
2. Prior Approved Equal

PART 3 EXECUTION

3.01 REFER TO PART 3 EXECUTION OF SECTION 40 70 01 - INSTRUMENTATION GENERAL REQUIREMENTS.

END OF SECTION 40 74 00

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