CITY OF HUDSON

Standard Project Manual for Utility and Street Construction

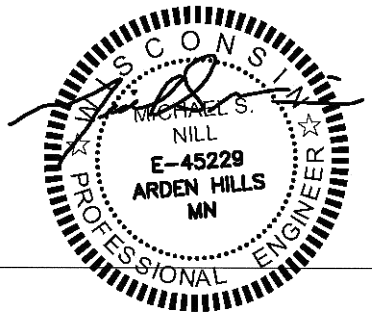
Bidding Requirements, Contracting Requirements, and Specifications

April 2019

DOCUMENT 00 01 05

CERTIFICATION

I hereby certify that the specification sections not listed below were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Wisconsin.

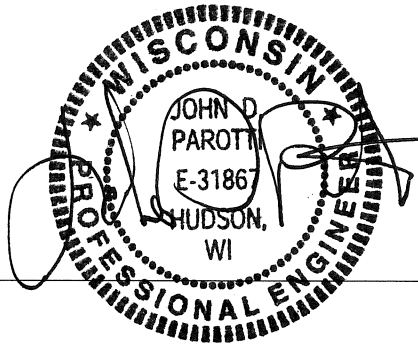


Michael S. Nill, PE

Date: 4/25/2019 License. No. E-45229

I hereby certify that the following specification sections were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Wisconsin.

Section #	Title
01 51 00	Temporary Utilities
33 01 30	Television Inspection of Sewers
33 05 20	Horizontal Directional Drilling (HDD) Pipe Installation
33 11 00	Water Distribution Systems
33 31 00	Sanitary Sewer Systems
33 34 00	Sewage Force Mains



John D. Parotti, PE

Date: 4/25/2019 License. No. E-31867

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SITE AND INFRASTRUCTURE SUBGROUP

Division 31 - Earthwork

Division 32 - Exterior Improvements

Division 33 - Utilities

Division 34 - Transportation

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ADVERTISEMENT FOR BIDS

RECEIPT AND OPENING OF PROPOSALS: Sealed proposals for the work described below will be received at the Office of the City Administrator, City of Hudson, 505 Third Street, Hudson, WI 54016 until **{{Bid Time}}**, **{{Bid Date}}**, at which time the bids will be opened and publicly read.

DESCRIPTION OF WORK: The work includes the construction of approximately:

{{General Description of work and major quantities}}

together with numerous related items of work, all in accordance with Plans and Specifications. This project is subject to Bidders Proof of Responsibility.

PLANHOLDERS LIST, ADDENDUMS AND BID TABULATION: The planholders list, addendums and bid tabulations will be available for download on-line at **{{website of Issuing Office}}** or www.questcdn.com. Any addendums may also be distributed by mail, fax or email.

TO OBTAIN BID DOCUMENTS: Complete digital project bidding documents are available at **{{website of Issuing Office}}** or www.questcdn.com. You may view the digital plan documents for free by entering Quest project #xxxxxxx on the website's Project Search page. Documents may be downloaded for $30.00. Please contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in free membership registration, viewing, downloading, and working with this digital project information. An optional paper set of project documents is also available for a nonrefundable price of **{{price}}** per set, which includes applicable sales tax and shipping. Please make your check to payable to **{{Issuing Office}}** and send it to **{{Issuing Office address, phone number, fax number}}**

The City of Hudson has adopted a standard document entitled "Standard Project Manual for Utility and Street Construction", dated April 2019, which includes the Procurement and Contracting Requirements and Specifications which are herby incorporated into the Bidding Documents. Bidders are required to obtain a copy of this standard document once per year. An electronic copy may be obtained for no charge from the City of Hudson website at the following link:

{{Insert Link}}

Direct inquiries to Engineer's Project Manager **{{Project Manager's Name}}** at **{{Project Manager's Phone Number}}**.

BID SECURITY: A certified check or proposal bond in the amount of not less than 5 percent of the total amount bid, drawn in favor of City of Hudson shall accompany each bid.

OWNER'S RIGHTS RESERVED: The Owner reserves the right to retain the deposits of the 3 lowest Bidders for a period not to exceed 60 days after the date and time set for the Opening of Bids. No Bids may be withdrawn for a period of 60 days after the date and time set for the Opening of Bids.

The Owner reserves the right to reject any or all bids and to waive any irregularities and informalities therein and to award the Contract to other than the lowest bidder if, in their discretion, the interest of the Owner would be best served thereby.

Devin Willi, City Administrator
City of Hudson, Wisconsin

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SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINED TERMS

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

A. Issuing Office – The office from which the Bidding Documents are to be issued and where the Bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation for Bids may be obtained from the Issuing Office.

2.02 Complete sets of Bidding Documents shall 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 authorize or confer a license for any other use.

2.04 Neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from Bidder's use of electronic downloadable Bidding Documents (Electronic Bidding Documents). In addition to the above items, Bidders using Electronic Bidding Documents are solely responsible for use of such documents, including, but not limited to:

A. It is the responsibility of the Bidder to go to the appropriate website, check for the presence of Bidding Documents (including Addenda), and download documents as they become available. Bidder shall regularly check the appropriate website for Addenda or other additions or revisions to the Bidding Documents through the Bid Opening date, whether or not Bidder has received email notice of Addenda from Engineer.

B. It is the responsibility of the Bidder to verify the intended document size (sheet dimensions) and to verify proper colors (color, or black and white) of the Electronic Bidding Documents prior to reproduction. Bidder shall ensure that the Electronic Bidding Documents are reproduced to the correct and exact scale, and correct colors.

C. It is the responsibility of the Recipient of Electronic Bidding Documents from this site to check the electronic data for computer viruses or other harmful coding.

D. Bidders are subject to the Terms of Use and Limitations on Use detailed in the Electronic Bidding Documents website.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

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

A. Evidence of Bidder's authority to do business in the state where the Project is located.

B. Evidence of genuiness of Bid and lack of collusion in conjunction therewith.

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

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

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

4.01 Site and Other Areas

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor

4.02 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:
   1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site.
   2. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. Copies of reports and drawings referenced in Paragraph 4.02.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 5.03 of the General Conditions has been identified and established in Paragraph 5.03 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.03 Underground Facilities

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

4.04 Hazardous Environmental Condition

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

B. Copies of reports and drawings referenced in Paragraph 4.04.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 shown or indicated in such drawings.

4.05 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents 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.

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

4.07 Reference is made to Section 01 10 00 Summary of the Project Specific Manual 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 contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.

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

A. examine and carefully study the Bidding Documents, 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, and performance of the Work;

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

E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences,

and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;

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(s) Bid and within the times required, 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. 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

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

4.09 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 There will be no Pre-Bid Conference.

ARTICLE 6 - SITE AND OTHER AREAS

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

ARTICLE 7 - INTERPRETATIONS AND ADDENDUM

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 Addendum mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than seven days prior to the date for Opening of Bids may not be answered. Only questions answered by Addendum 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 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid Bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions.

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 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid Security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid Security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or 61 days after the Bid Opening, whereupon Bid Security furnished by such Bidders will be returned.

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

ARTICLE 9 - CONTRACT TIMES

9.01 The number of days within which, or the dates by which, Milestones are to be achieved and the Work is to be Substantially Completed and ready for Final Payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, 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 "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk

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 a specified date prior to the Effective Date of the Agreement, the apparent successful Bidder, and any other Bidder so requested, shall within 5 days after Bid Opening, submit to Owner a list of all such subcontractors, suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be 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 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 6.06 of the General 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 in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid Item, Alternate, adjustment Bid Unit Price Bid Item, and Bid Unit Price Bid Item listed therein.

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

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

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 shall be shown.

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 venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

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

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.10 Postal and e-mail addresses and telephone and fax numbers for communications regarding the Bid shall be shown.

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

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 Unit Price, or Unit Price With Alternates

A. Bidders shall submit a Bid on a Bid Unit Price basis for each Bid Item of Work listed in the Bid Form:

1. If an Alternate is present, include a separate unit price for each Alternate provided on the Bid Form. The price for the Alternates will be the amount added to or deleted from the Base Bid if the Owner selects the Alternate. In the evaluation of Bids, Owner may select any combination of Alternates or Owner may choose not to accept any Alternate Bids.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each Bid Item and the corresponding Bid Unit Price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of work and Bid Unit Prices will be resolved in favor of the Bid 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.

D. Bids will be evaluated and the low Bidder determined pursuant to Article 19:

1. If no Alternate is present, bids will be compared on the basis of the "Total Base Bid" and this amount will be the basis for determining the lowest Bidder.
2. If an Alternate is present, bids will be compared on the basis of the "Adjusted Total Base Bid" and this amount will be the basis for determining the lowest Bidder. The sum of the Total Base Bid and any combination of Alternates accepted by the Owner will determine the "Adjusted Total Base Bid."

14.02 Allowances

A. For cash allowances, the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 11.02.B of the General Conditions.

ARTICLE 15 - SUBMITTAL OF BID

15.01 Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation for Bids and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid Security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Owner's office.

15.02 The Bid shall include the entire Document 00 41 10, Bid Form. This includes all attachments listed in Article 7.01 of the bid form and/or all forms included with the Bid Form. The Contractor may remove or copy these sheets from the Project Manual.

15.03 The entire Project Manual should not be submitted with the Bid.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

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

16.02 Bids may be withdrawn after Bid Opening only in accordance with the law.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Base Bids and major Alternates, if any, will be made available to Bidders after the Project is awarded.

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 the Bid Security prior to the end of this period.

ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 If the Contract is awarded, award will be made on the basis of the lowest responsive, responsible, qualified Bidder determined by the Total Base Bid, or Adjusted Total Base Bid if an Alternate is present, which is found by the City to be in the best interest of the project.

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

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

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

19.05 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 Supplementary Conditions.

19.06 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 proposed for those portions of the Work in accordance with the Contract Documents. As a condition of its Bid, Bidder is required to waive any and all claims of whatever nature against Owner,

Engineer, and their employees and agents which arise out of or relate to such investigations and statements made as a result thereof, except for statements that can be shown by clear and convincing evidence to be intentionally false and made with actual malice. This waiver is not intended to restrict Bidder's rights to challenge a Contract pursuant to law.

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 shall be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within 10 days thereafter, Owner shall deliver 2 fully signed counterparts to successful Bidder with a complete set of the Drawings with appropriate identification.

END OF SECTION

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BIDDER: _____

DOCUMENT 00 41 10

BID FORM

PROJECT NAME

CITY PROJECT NO.

PROJECT NO.

HUDSON, WISCONSIN

THIS BID IS SUBMITTED TO:
City of Hudson
City Hall
505 Third Street
Hudson, WI 54016-1694

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.

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

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, including the City of Hudson's Standard Project Manual for Utility and Street Construction, dated April 2019, 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 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 relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that have been identified in Division 00 of the Project Specific Manual, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Division 00 of the Project Specific Manual.

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

F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

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

H. 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.

I. 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.

J. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

4.01 Bidder certifies that:

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

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

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

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

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

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

"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

"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.

5.01 Bidder will complete the work in accordance with the Contract Documents for the following price(s):

Unit Prices have been computed in accordance with Paragraph 13.03 of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and Final Payment for all Unit Price Bid Items will be based on actual quantities provided, determined as provided in the Contract Documents.

The Bid Form shall cover all Work depicted on the contract drawings and/or required by the Specifications. All costs in connection with the Work including furnishing of all materials, equipment, and performing necessary labor, coordination, supervision, and management to fully complete the Work, shall be included in the Unit or Lump Sum prices quoted in the Bid Form. All Work not specifically set forth as a pay item in the Bid Form shall be considered incidental to the Project and all costs in connection therewith shall be included in the amounts and prices submitted in the Bid Form.

No.	Item	Units	Qty	Unit Price	Total Price
	PART 1 - SANITARY SEWER:				
1				$ _____	$ _____
2				$ _____	$ _____
	TOTAL PART 1 - SANITARY SEWER				$ _____
	PART 2 - WATER MAIN:				
3				$ _____	$ _____
4				$ _____	$ _____
	TOTAL PART 2 - WATER MAIN				$ _____
	PART 3 - SERVICES:				
5				$ _____	$ _____
6				$ _____	$ _____
	TOTAL PART 3 - SERVICES				$ _____

No.	Item	Units	Qty	Unit Price	Total Price
	PART 4 - STORM SEWER:				
7				$ _____	$ _____
8				$ _____	$ _____
	TOTAL PART 4 - STORM SEWER				$ _____
	PART 5 - STREET IMPROVEMENTS:				
9				$ _____	$ _____
10				$ _____	$ _____
	TOTAL PART 5 - STREET IMPROVEMENTS				$ _____
	BASE BID:				
	TOTAL PART 1 - SANITARY SEWER				$ _____
	TOTAL PART 2 - WATER MAIN				$ _____
	TOTAL PART 3 - SERVICES				$ _____
	TOTAL PART 4 - STORM SEWER				$ _____
	TOTAL PART 5 - STREET IMPROVEMENTS				$ _____
	TOTAL BASE BID				$ _____

6.01 Bidder agrees that the work will be Substantially Completed and completed and ready for Final Payment in accordance with the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

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

A. Required Bid security in the form of Five Percent.

B. Bidders Proof of Resonsibility Form Affidavit & Acknowledgement

1. 00 41 20 - Bidders Proof of Responsibility (if requested)

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

SUBMITTED on _____, 20__

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

Business address: _____

_____

Phone No.: _____ Fax No.: _____

A Partnership

Partnership Name: _____(SEAL)

By: _____
(Signature of general partner)

Name (typed or printed): _____

Business address: _____

_____

Phone No.: _____ Fax No.: _____

A Corporation

Corporation Name: _____(SEAL)

State of Incorporation: _____

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

By: _____
(Signature)

Name (typed or printed): _____

Title: _____

Attest _____ (CORPORATE SEAL)
(Signature of Corporate Secretary)

Business address: _____

_____

Phone No.: _____ Fax No.: _____

A Joint Venture

Joint Venture Name: _____(SEAL)

By: _____
(Signature of joint venture partner)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ Fax No.: _____

Joint Venturer Name: _____(SEAL)

By: _____

(Signature)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ Fax No.: _____

Phone and Fax Number, and Address for receipt of official communications:
_____

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

END OF DOCUMENT

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SECTION 00 41 20

BIDDERS PROOF OF RESPONSIBILITY

PART 1 GENERAL

1.01 SUMMARY

A. If requested by Owner, a Bidders Proof of Responsibility must be submitted to the Owner within 5 days.

B. On all contracts, bidder must submit a full and complete statement sworn to before any officer authorized to administer oaths of financial ability, equipment, experience in the work prescribed, and such other matters as the municipality may require for the protection and welfare of the public (Section 66.29 (2), Wisconsin Statutes).

C. The objective of the questionnaire is not to discourage bidding or make it difficult for qualified bidders to file bids. Neither is it intended to discourage beginning contractors. It is intended to make it possible for the Owner to have exact information on financial ability, equipment and experience involved in awarding contracts to parties unfamiliar to the Owner. Owner reserves the right to require additional information before awarding the contract in order to determine qualification for the work.

D. The contents of this questionnaire will be considered confidential.

E. This questionnaire is to be submitted to the Owner; the outside clearly marked "BIDDERS PROOF OF RESPONSIBILITY":

F. It is recommended that this questionnaire be returned by Registered Mail.

G. If the Owner is not satisfied with the sufficiency of the answers to the questionnaire a financial statement may be required or they may reject the bid or require additional information.

1.02 STATEMENT OF BIDDER'S QUALIFICATIONS

A. Name of Bidder:

B. Bidder's Address:

C. When Organized:

D. Where Incorporated:

E. How many years have you been engaged in the contracting business under the present firm name:

F. Contracts on hand (attach a list of present contracts, including a schedule as to estimate completion date and gross amount of each contract).

G. General character of work performed by your firm.

H. Have you ever failed to complete any work awarded to you:

Yes ____ No ____ If so, attach a statement detailing where and why.

I. Have you ever defaulted on a contract:

Yes ____ No ____ If so, attach a statement detailing where and why.

J. Attach a list of more important contracts completed by your firm, including kind of work and approximate cost.

K. Attach list of your major equipment.

L. Attach a statement of your experience in the construction of work similar in scope to this project.

M. Attach statement of background and experience of the principal members of your personnel, including the officers.

N. Credit availability: Furnish written evidence, preferably from banks.

O. Additional information may also be submitted if desired

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 00 52 10

AGREEMENT FORM

THIS AGREEMENT is by and between the City of Hudson, Wisconsin (hereinafter called Owner) and **{Name of Contractor}** (hereinafter called Contractor).

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

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: municipal utility and street construction.

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: **{Name of Project}** for the City of Hudson, Wisconsin, City Project No. **{City Project No.}**.

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by **{Name of Engineer**} (Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and will 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 the 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 of the essence of the Contract.

4.02 *Dates for Substantial Completion and Final Payment*

A. The Work will be Substantially Completed on or before **{Date}**, and completed and ready for Final Payment in accordance with Paragraph 15.06 of the General Conditions on or before **{Date}**. Substantial Completion Date shall be defined as the completion of the following items:
   1. **{Item}**
   2. **{Item}**
   3. **{Item}**

B. Except to the extent an earlier date is provided above for a portion of the Work, the Final Completion for the Project shall be **{Date}**.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above 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 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in

proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner **{Dollar Amount}** for each day that expires after the time specified in Paragraph 4.02 for Milestones and Substantial Completion until the Work is Substantially Complete.

B. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner **{Dollar Amount}** 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 as follows:

A. For all Work at the prices stated in Contractor's Bid, attached hereto as an exhibit. The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 10.06 of the General Conditions.

B. Original Contract Amount is based on **{fill in amount after Award}.**

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 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, monthly during performance of the Work as provided in Paragraphs 6.02.A1 and 6.02.A2 below. All such payments will be measured by the Schedule of Values established in Paragraph 2.07.A of the General Conditions (and in the case of Bid Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided in the General Requirements:
   1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 15.01 of the General Conditions:
      a. 95 percent of Work completed (with the balance being retainage).
      b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
   2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Article 15 of the General Conditions and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the

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

6.03 *Progress Payment to Subcontractors*

A. For contracts within the State of Wisconsin, WI Statute 66.0135 Subd. 3a. shall apply. WI Statute 66.0135 Subd. 3a. requires:

1. The prime contractor shall pay any subcontractor within seven days of the prime contractor's receipt of payment for undisputed services provided by the subcontractor.

2. The prime contractor shall pay interest in accordance with WI Statute 66.0135.3b to the subcontractor on any undisputed amount not paid on time to the subcontractor.

3. The minimum monthly interest penalty payment for an unpaid balance of $100 or more is $10. For an unpaid balance of less than $100, the prime contractor shall pay the actual penalty due to the subcontractor.

4. A subcontractor who prevails in a civil action to collect interest penalties from a prime contractor must be awarded its costs and disbursements, including attorney's fees, incurred in bringing the action.

6.04 *Final Payment*

A. Upon Final Completion and acceptance of the Work, in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due, as provided in Article 15 of the General 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 as 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 of 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 relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Supplementary Conditions as containing reliable "technical data."

E. Contractor considered the information known to Contractor, information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work, (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precaution programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

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 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.

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

J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:
   1. This Agreement.
   2. Performance Bond, Payment Bond, and other Bonds.
   3. City of Hudson, Wisconsin Standard Project Manual for Utility and Street Construction, dated April 2019, and all subsequent amendments.
   4. Project Specific Manual.
   5. Drawings bearing the following general title: **{Title of Drawings}**.
   6. Addenda (**{Addendum Letter}** to _____, inclusive).
   7. Exhibits to this Agreement (enumerated as follows):
      a. Contractor's Bid Form.
      b. Documentation submitted by Contractor prior to Notice of Award.
   8. 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. Work Change Directives.
      c. Change Order(s).
      d. Field Order(s)

B. The documents listed in Paragraph 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 Article 3 of the General Conditions.

ARTICLE 10 –MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the 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 any thing 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. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been 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:**
City of Hudson, Wisconsin	_____
By: _____ Mayor, Rich O'Connor	By: _____
By: _____ City Administrator, Devin Willi	Attest _____
Address for giving notices:	Address for giving notices:
505 Third Street	_____
Hudson, WI 54016-1694	_____
	License No. _____ (Where applicable)
Designated Representative:	Designated Representative:
Name: _____	Name: _____
Title: _____	Title: _____
Address: 505 Third Street	Address: _____
Hudson, WI 54016-1694	_____
Phone: 715-386-4765	Phone: _____
Facsimile: 715-386-0804	Facsimile: _____

END OF SECTION

PERFORMANCE BOND

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

CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):

CONTRACT

Effective Date of Agreement:
Amount:
Description (*Name and Location*):

BOND

Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

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

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   2.3 Owner has agreed to pay the Balance of the Contract Price to:
      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

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

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

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

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

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

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

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

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PAYMENT BOND

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

CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):

CONTRACT

Effective Date of Agreement:
Amount:
Description *(Name and Location)*:

BOND

Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

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

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

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

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

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

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

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

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

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

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

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1 Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

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

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

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

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

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

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

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

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

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

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

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

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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

Issued and Published Jointly by

These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a 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, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

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

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

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

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

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

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

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

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

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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

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

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

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

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

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

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

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

a. does not conform to the Contract Documents; or

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

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a 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 Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

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

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

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

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

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 Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law 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 Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

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 all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

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

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

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; 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 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and 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 shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

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

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

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

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

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

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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 the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

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 as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

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

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

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

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

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

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

2. Technical Data contained in such reports and drawings.

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 Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

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

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates 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, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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 all of Contractor's obligations under the Contract. These bonds shall 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 Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

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

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

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

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

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

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *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 shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

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 notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

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

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

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

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

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

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

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

4) it is not objectionable to Owner.

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

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

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "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 shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

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 that specified, and

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

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

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 shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

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

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

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

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

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the 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.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

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 shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

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

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

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

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

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

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

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

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

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

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

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

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

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. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

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 and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by 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.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

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

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. 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 shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

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

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

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 Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

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

11.01 *Amending and Supplementing Contract Documents*

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

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: 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 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

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. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

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 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

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

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

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

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

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 shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 *Cost of the Work*

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

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

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. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

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, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the 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. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

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

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

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 shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, 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, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 *Progress Payments*

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

B. *Applications for Payments*:

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. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

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

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

C. *Review of Applications*:

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, or

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

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

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

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

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;

l. there are other items entitling 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 shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its 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 E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract 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 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

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 Application and Acceptance*:

1. 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 ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If 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 claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

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

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

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, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

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

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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 shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

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

18.08 *Headings*

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

SECTION 00 73 05

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. C-700, 2013 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

SC-1.01.A.25 Add the following language at the end of the definition of Milestone:

Specific milestones, if any, are described in Section 00 52 10.

SC-1.01.A.40 Add the following language at the end of the definition of Substantial Completion:

Substantial Completion is further described in Section 00 52 10.

SC-1.02 Add the following new paragraph immediately after Paragraph 1.02.F:

G. The Specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

ARTICLE 2 - PRELIMINARY MATTERS

SC-2.02.A Delete Paragraph 2.02A in its entirety, and replace with the following:

SC-2.02.A Owner shall furnish to Contractor 1 printed copy and 1 electronic (PDF) version of the Contract Documents. Additional printed copies may be obtained as directed in the Advertisement for Bids. Limitations of use of electronic and printed documents are described in the Instructions to Bidders, and General Conditions.

ARTICLE 5 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

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

C. Reports of explorations and tests of subsurface conditions at or contiguous to the Site known to Owner are identified in Division 00.

D. The reports and drawings identified above are not part of the Contract Documents, but the "technical data" contained therein upon which Contractor may rely, as expressly identified and established above, are incorporated in the Contract Documents by reference. Contractor is not entitled to rely upon any other information and data known to or identified by Owner or Engineer.

E. Copies of reports and drawings identified in SC-5.03.C and SC-5.03.D that are not included with the Bidding Documents may be examined at the office of Engineer during regular business hours.

SC-5.05.A Add the following new item immediately after Item 2.d:

3. The subsurface utility information on the Drawings is utility quality level D, unless otherwise noted. This quality level was determined according to the guidelines of CI/ASCE 38-.2, entitled "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data."

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

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

ARTICLE 6 - BONDS AND INSURANCE

SC-6.01 Add the following new paragraph immediately after Paragraph 6.01.F:

G. Separate Performance and Payment Bonds should be submitted utilizing EJCDC Form C-610 and C-615 (2013 Edition) or a similar bond form if approved by Owner.

SC-6.02 Delete Paragraph 6.02.D in its entirety.

SC-6.03 Delete paragraph 6.03.J in its entirety and insert the following:

J. The coverage requirements for specific policies of insurance, including the requirements of SC 6.03.K.2.a, must be met by such policies, with exception that an Excess or Umbrella Liability insurance policy may be used to supplement Contractor's policy limits on a follow-form basis to satisfy the full policy limits required by this Contract

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

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

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:		Statutory
Federal, if applicable (e.g., Longshoreman's):		Statutory
Jones Act coverage, if applicable:		
Bodily injury by accident, each accident	$	Not Applicable
Bodily injury by disease, aggregate	$	Not Applicable
Employer's Liability:		
Bodily injury, each accident	$	1,000,000.00
Bodily injury by disease, each employee	$	1,000,000.00
Bodily injury/disease aggregate	$	1,000,000.00

For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of: Not Applicable

Foreign voluntary worker compensation Statutory

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	2,000,000.00
Products - Completed Operations Aggregate	$ 2,000,000.00
Each Occurrence (Bodily Injury and Property Damage)	$ 1,500,000.00
Personal and Advertising Injury	$ 1,500,000.00

a. The aggregate limits under SC-6.03.K.2 (Commercial General Liability) be maintained fully available for this Contract by obtaining and maintaining a Designated Construction Project General Aggregate Limit endorsement, or equivalent

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:	
Each person	$ 1,000,000.00
Each accident	$ 1,000,000.00
Property Damage:	
Each accident	$ 1,000,000.00
OR	
Combined Single Limit of	$ 1,000,000.00

4. Excess or Umbrella Liability:

Per Occurrence	$ Not Applicable
General Aggregate	$ Not Applicable

5. Contractor's Pollution Liability:

Per Occurrence	$ Not Applicable
General Aggregate	$ Not Applicable

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

6. Additional Insureds: Owner and Engineer

SC-6.05.A Add the following new paragraphs immediately after item 13:

14. include for the benefit of Owner loss of profits and soft cost coverage including, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, plus attorney's fees and engineering or other consultants' fees, if not otherwise covered.

15. The Builder's Risk Insurance required herein shall apply to projects involving construction of structures and buildings only. The requirements of this Section shall be waived on projects involving only underground utilities, grading, street improvements, and similar construction work but any damage or loss to property shall be at the sole responsibility of Contractor until final acceptance of the Work

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

SC-7.02.C Add the following new item:

C. No Work shall be done from 7 P.M. to 7 A.M. any day of the week. However, Owner reserves the right to adjust these hours based upon the type and location of the work.

SC-7.08.A Amend the first sentence of Paragraph 7.08.A by replacing the words "Contract Documents" with the words "Division 01."

ARTICLE 8 – OTHER WORK AT THE SITE

SC-8.04 Add the following paragraphs immediately after paragraph 8.03:

8.04 Claims Between Contractors

8.04.A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, then Contractor (without involving Owner, Engineer, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

8.04.B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, the construction coordinator 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 other contractor against Owner, Engineer, consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator 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 the construction coordinator on account of any such damage or Claim.

8.04.C. If Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another 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 construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities

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

SC-11.01.A.2 Amend the second sentence of Paragraph 11.01.A.2 by replacing the words "30 days" with the words "10 days." Amend the third sentence of Paragraph 11.01.A.2 by replacing the words "60 days" with the words "30 days".

SC-11.06.A.1 Amend the first sentence of Paragraph 11.06.A.1 by replacing the words "30 days" with the words "10 days".

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

SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. The quantities for each Bid Item shown in the Bid Form have been estimated as accurately as possible based on the best information available at the time of preparation of these Construction Documents. Payment for the Bid Items on a Unit Price basis under this Contract shall be on the basis of quantities actually used in the construction, regardless of the estimated quantities shown in the Bid Form. No revision to the Contract Unit Prices for the Bid Items shall be considered or allowed due to variations of the actual quantities from the estimated amounts. Certain quantities may be expected to vary more than others, such as excavation, asphalt pavement, erosion control, and restoration.

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

SC-14.05.C.2 Amend the second sentence of Paragraph 14.05.C.2 by replacing the words "30 days" with the words "10 days".

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

SC-15.01.B Add the following Paragraph 15.01.B.4 immediately after Paragraph 15.01.B.3:

4. Before final application for payment is made for the work, Contractor must make satisfactory showing of compliance with the provisions of Wisconsin Statutes requiring the withholding of state income taxes for wages paid to employees on this project.

SC-15.01.C.5 Delete Paragraph 15.01.C.5 and replace with the following:

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, or Contractor has failed to make acceptable submittals in accordance with the accepted schedules.

SC-15.08.A Amend the first sentence in Paragraph 15.08.A by replacing the words "one year" with the words "two years".

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

SC-16.01.A Amend the third sentence of Paragraph 16.01.C.2 by replacing the words "30 days" with the words "10 days".

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for pricing of Work and request for payment procedures.

B. Related Sections:
   1. Section 01 33 00 – Submittal Procedures

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. All Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 BID UNIT PRICES

A. Provide access and assist Engineer in determining actual quantities of Bid Unit Price work.

B. Provide documentation to substantiate Bid Unit Price work.

C. If the Contractor delivers and places more of any material that is paid for on a Bid Unit Price basis than is required to perform the Work and thereby causes the materials to be wasted, the quantity wasted will be deducted from the final measurement for that Bid Item.

1.04 PAYMENT PROCEDURES

A. Engineer will provide initial Application for Payment Form at the Preconstruction Conference.

B. Submit 1 preliminary copy of progress payment application for review, consistent with Article 15 of the General Conditions. Submit 4 signed copies of Application for Payment to Engineer prior to the dates identified at the Preconstruction Conference.

C. Attach the following supporting documentation, in addition to the requirements of Article 15 of the General Conditions:
   1. Documentation to substantiate Bid Unit Price work.
   2. Updated construction schedule consistent with Section 01 33 00.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. General requirements for overall Project coordination.

B. Related Sections:
   1. Section 01 33 00 – Submittal Procedures

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. All Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 PROJECT COORDINATION

A. Coordinate all Work with the Engineer and Public Works Director. The Public Works Director and staff are located at the Hudson City Hall at 505 Third Street. Regular office hours are 8 A.M. to 4:30 P.M, Monday through Friday.

B. Coordinate the Work of the Contract and the Work of others relating to the Project. Work with others to cause the efficient and timely completion of the Work. These responsibilities include, among others, the following:
   1. Coordinate activities of all sub-contractors.
   2. Inform emergency services (Police, Fire, EMS), Post Office, and Schools of traffic situations as appropriate to Project circumstances.
   3. Inform City Public Works Department of Project schedule and upcoming activities that will affect their operation.
   4. Inform non-municipal utilities (gas, telephone, electric, etc.) of Project schedule to allow for planning of any activities they wish to coordinate with the Project.
   5. Maintain and coordinate access needs of adjacent properties.

1.04 UTILITIES

A. Notify Wisconsin's Diggers Hotline before starting construction in a given area to request utility locates within the Site:
   1. Engineer has requested information at time of construction document preparation on existing private utilities via design locate request through the Diggers Hotline.
   2. The original version of the information supplied by the utilities is available for viewing at the office of the Engineer.

B. Known Information On Private Utilities: Known information regarding the private utilities is depicted on the Drawings and information supplied by utility companies can be viewed at the office of the Engineer by request.

C. Project Utility Sources: Coordinate Work with the following utility owners:
   1. City of Hudson Public Works 715-386-4765
   2. Diggers Hotline 800-242-8511

D. Owner requires a 48-hour notice for all utility interruptions.

E. Coordinate the relocation or protection of all existing facilities. Any costs for such Work shall be the responsibility of the Contractor.

1.05 PERMITS

A. Comply with the stipulations of the following permits, which have been applied for and will be furnished by the Owner:
   1. Wisconsin Department of Natural Resources (DNR) Permit for Sanitary Sewer Extensions.
   2. Wisconsin Department of Natural Resources (DNR) Permit for Water Main Extensions.
   3. Wisconsin Department of Natural Resources (DNR) General Permit to Discharge Under the Wisconsin Pollutant Discharge Elimination System WPDES Permit No. WI-S067831-5.

B. Apply for, obtain, and comply with the provisions of the following permits, which the Owner will waive the permit application fee:
   1. City Building Permit.

C. Apply for, obtain, and comply with other permits, licenses, and approvals which may be required for the Project.

1.06 SURVEYING AND CONSTRUCTION OBSERVATION

A. Provide Engineer a minimum of 48-hour notice in advance of the need for establishing lines, grades, measurements, grade checks, and observation of Work.

B. Engineer will furnish a Resident Project representative consistent with Paragraph 10.03 of the General Conditions.

C. The Contractor is responsible for:
   1. Grades and elevations for pedestrian ramps.

1.07 PROJECT MEETINGS

A. Administrative Requirements:
   1. Project Superintendent or persons designated by the Contractor to attend and participate in the Project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the Project meetings.
   2. Engineer will set the time, sites, and prepare the agenda for the meetings.
   3. Engineer will prepare meeting minutes and distribute 1 copy to Contractor. Notify Engineer of inaccuracies or discrepancies in the meeting minutes within 5 calendar days of receipt of the minutes.
   4. The attendance and cooperation of subcontractors and suppliers may be required.

B. Preconstruction Conference:
   1. Provisions for the Preconstruction Conference are set forth in the General Conditions.
   2. Requirements for preconstruction submittals are set forth in the General Conditions. Submittal procedures shall be consistent with Section 01 33 00.

C. Progress Meeting Procedures:
    1. Weekly Status Meetings will be held during weeks when construction activity is occurring on the Project. The meetings will take place at Hudson City Hall. Day and time will be determined at the preconstruction meeting. If no Work is occurring, no meeting will be required:
        a. Weekly Status Meetings are anticipated to be 30 to 60 minutes in length.
        b. Furnish a detailed schedule of work for the following week and provide an update on construction activity from the previous week.
        c. Developers, private utilities, and others may attend to communicate Project issues.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. General procedures and requirements for submittals during construction.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. All Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 SEQUENCING AND SCHEDULING

A. Schedule submittals consistent with the Contractor's schedule of shop drawings.

1.04 SUBMITTALS

A. Manhole/Catch Basin Elevation Report:
   1. Complete the report attached to the end of this Section for each storm and sanitary sewer structure as it is constructed. Submit complete report each week to the Engineer or the Engineer's designated representative at some mutually agreeable time.

B. Service Data:
   1. Product data for the following items:
      a. Pipe and fittings.
   2. Provide and record information on the "Sewer and Water Service Data Sheet" (Contractor Responsibility. A sample of the Data Sheet for recording required measurements is provided at the end of this Section and a copy can be provided by Engineer.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 CONSTRUCTION SCHEDULE

A. Submit preliminary schedule and progress schedule consistent with the General Conditions.

B. Prepare schedules on 11-inch by 17-inch sheets showing overall sequence of construction. Organize the schedule by work activity. Identify separate stages of each work activity:
   1. List work items in chronological sequence. Show beginning and completion dates of each activity. Include all activities with an estimated duration of 3 days or longer.
   2. Format schedule as a horizontal bar chart. Provide separate bars for each activity or trade.
   3. Provide space for revisions and notations.
   4. Identify interrelations between activities.

5. Include estimated times for preparation of submittals by Contractor, processing and review of submittals by Engineer, fabrication, delivery, installation, testing, start-up, instruction of Owner, and clean-up.

C. As Work progresses, revise, update, and resubmit schedule as requested by Engineer. At a minimum, update schedule with each Application for Payment. Show all activities started or finished since previous schedule was submitted and show percentage of completion for each activity.

3.02 EMERGENCY CONTACT LIST

A. Before any Work at the Site is started, submit a typed list on 8.5-inch by 11-inch paper outlining 24-hour on-call contacts for the Project. This list shall include the Contractor's safety representative, key representatives from the Contractor, subcontractors, and suppliers. Include the following information for each contact:
   1. Company name.
   2. Contact person(s).
   3. Local and mobile phone numbers.
   4. Fax number.

3.03 SHOP DRAWINGS AND MANUFACTURERS' INFORMATION

A. Conform to the requirements of the General Conditions, except as modified herein.

B. The minimum sheet size shall be 8.5-inch by 11-inch. Non-legible copies will not be reviewed.

C. Submit a minimum of 3 copies of shop drawings, plus the quantity of copies the Contractor wants returned. Each copy shall contain the following information:
   1. Date of submission and date of any previous submittals.
   2. Project Title.
   3. Names Of: Contractor, subcontractor, supplier, and manufacturer.
   4. Identification of product and Specification Section number.
   5. Identification of revisions from previous submittals.
   6. A 4-inch by 4-inch blank space for the Engineer's stamp.

D. Engineer's review will be in conformance with the requirements of the General Conditions, except as modified herein.

E. Engineer will stamp shop drawings and indicate requirements for Contractor's review or re-submittal as follows:
   1. "Approved" – Appears that items covered by the submittal will, after installation or incorporation into the Work, conform to the Contract Documents and appears to be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
   2. "Approved as Noted" – Appears that items covered by the submittal will, after installation or incorporation into the Work, conform to the Contract Documents and appears to be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, except as noted by Engineer.
   3. "Revise and Resubmit" – Appears that items covered by the submittal will not, after installation or incorporation into the Work, conform to the Contract Documents and will not be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Work cannot proceed until the submittal is revised and resubmitted conforming to the re-submittal procedures described in the General Conditions.

4. "Rejected" – Work covered by the submittal is not complete or it appears that items covered by the submittal will not, after installation or incorporation into the Work, conform to the Contract Documents and will not be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall conform to the re-submittal procedures described in the General Conditions.

F. Engineer will return reviewed submittals via email.

3.04 MATERIAL AND SAFETY DATA SHEETS

A. Furnish Owner with current copies of Material Safety Data Sheets for all chemicals and products on Site.

END OF SECTION

Manhole/Catch Basin Field Elevation Report

Project:	Date:
Owner:	Contractor:
Engineer's Resident Project Representative :	Contractor's Representative:
Engineer's Project No:	Owner Project No:

Contractor is required to complete this form before payment of structure is approved.

Structure Location				Structure Type (circle one)	Design Invert (from Plan)	As-Constructed Invert Elevation *	Difference (+ / -)	Comments / Quality Assurance
Structure No.	Structure Station	Direction of invert/flow	Street Name or Easement Location					
				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				
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				MH CB Endwall				
				MH CB Endwall				
				MH CB Endwall				

*** - As-Constructed Invert Elevation provided by Contractor from measurements taken in the field to nearest 0.01 feet**

SEWER AND WATER SERVICE DATA

RECORD PLAN DATA						CONTRACTOR RESPONSIBILITY							
						RISER			SEWER INVERT ELEVATION AT END	FIELD MEASUREMENTS			
LOT NO.	BLOCK NO.	WYE STATION	COORDINATES OF CURB STOP OR END OF WATER PIPE			INVERT AT TOP OF RISER PIPE	DISTANCE FROM CENTER OF PIPE	LENGTH		SERVICE LENGTH		CURB STOP TO SEWER PLUG	SEWER PIPE TO WATER LINE
			X	Y	Z					WATER	SEWER		

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SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Information required for conformance to regulatory requirements.
   2. Quality assurance.
   3. Procedures to measure and report the quality and performance of the Work.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. All Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCE STANDARDS

A. Whenever reference is made to the Wisconsin Department of Transportation Standard Specifications, such reference shall mean "Standard Specifications for Highway and Structure Construction" 2019 Edition (WisDOT Spec.) and all subsequent revisions and supplements. The word "Engineer" is understood to refer to the Engineer for the Owner.

1.04 SUBMITTALS

A. Prior to start of Work, submit testing laboratory name for various specified tests for approval by Engineer.

B. Laboratory test results or analysis.

C. Manufacturer's certificates of quality control or performance.

1.05 WORKMANSHIP

A. Comply with industry standards of the region, except where more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

1.06 TESTS AND INSPECTIONS

A. Conform to the requirements of the General Conditions, except as modified herein.

B. Notify Engineer 48 hours prior to expected time for operations requiring tests and inspections.

C. Provide incidental labor and facilities to obtain and handle samples at Site or source, transport samples to laboratory, and facilitate tests and inspections for storing and curing of test samples.

D. Owner shall pay for all required tests, except as indicated in the Specifications:
   1. If any test fails to meet requirements, reimburse Owner for cost of all subsequent tests to ensure compliance.

E. Notify Engineer of pit and scale location and other correlated items prior to beginning Work.

F. Following substantial completion of the project and in accordance with Article 15.05 of the General Conditions, the Engineer and Owner will perform a Final Inspection of the work performed under the contract. Based on that Inspection one initial Inspection Notice Report (INR) will be prepared. Contractor shall notify Engineer when items listed in INR have been completed. The Engineer will inspect Contractor's work a second time to verify the items in the initial INR have been completed. If there are items still unacceptable to the Owner/Engineer, a second INR will be prepared. All costs for Owner's/Engineer's time to prepare the second and, if needed, subsequent INRs and to verify that the work has been completed will be the Contractor's responsibility.

1.07 LABORATORY REPORTS

A. After each inspection and test, submit 3 copies of Laboratory Report to Engineer.

B. Include: Date issued, Project title and number, name of inspector, date and time of sampling or inspection, identification of product and Specifications Section, location in the Project, type of inspection or test, date of test, results of tests, and conformance with Contract Documents.

1.08 LABORATORY RESPONSIBILITIES

A. Test samples and perform field tests.

B. Provide qualified personnel. Cooperate with Engineer and Contractor in performance of services.

C. Ascertain compliance with the requirements of the Contract Documents.

D. When requested by Engineer, provide interpretation of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop Work.

1.10 MANUFACTURER'S CERTIFICATES

A. If requested by Engineer, submit manufacturer's certificate with shop drawings certifying that products meet or exceed specified requirements executed by responsible officer.

1.11 MANUFACTURER'S FIELD SERVICES

A. Provide qualified representative to observe field conditions; conditions of surfaces and installation; quality of workmanship; start-up of equipment; and test, adjust, and balance of equipment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Temporary utilities and miscellaneous temporary facilities required during construction.

B. Products furnished but not installed under this Section or products installed but not furnished under this Section.

C. Related Sections:
   1. Section 01 33 00 – Submittal Procedures.
   2. Section 33 11 00 – Water Distribution Systems.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Mobilization: Measurement will be per EACH and paid in accordance with the schedule in the referenced WisDOT Specification. Payment will be considered compensation in full for all work and costs of this Bid Item for the entire Project.
   2. Traffic Control: Measurement is Lump Sum. This shall be considered payment in full for all labor, equipment, and materials associated with the required Traffic Control devices for the entire Project, including any detours. This Bid Item shall include but not be limited to furnishing, installing, and relocating the Traffic Control due to various road closures, daily maintenance, and ultimate removal of all such devices used over the duration of the Contract or as directed by the Engineer. Partial payment of the Lump Sum Item "Traffic Control" will be made using a percentage based on the following:

	Cumulative Percent of Traffic Control Item Paid
First Partial Payment	50
Percent of original Contract amount earned – 25	70
Percent of original Contract amount earned – 50	90
Percent of original Contract amount earned – 100	100

   3. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. The Wisconsin Manual on Uniform Traffic Control Devices (WMUTCD), including the Field Manual on Temporary Traffic Control Zone Layouts – Latest edition.

B. Wisconsin Traffic Engineering, Operations and Safety Manual (WTEOpS).

C. Wisconsin Department of Transportation Work Zone Safety Guide.

1.04 SUBMITTALS

A. Construction Staging Plan consistent with Section 01 33 00, including the following information:
   1. Sequence of construction and traffic control.
   2. Streets closed or restricted during any stage of construction.
   3. Provisions for routing any detoured traffic as permitted.
   4. Specific signs, striping, and other traffic control devices to be utilized.

B. Traffic Management Plan consistent with Section 01 33 00, including the following information:
   1. Haul and access routes.
   2. Permits or applications required by local authorities.
   3. Temporary facilities required.

1.05 SEQUENCING AND SCHEDULING

A. Notify the Engineer in writing at least 72 hours prior to the start of any construction operation that will necessitate lane closure or internal traffic control signing.

B. The traffic control devices required along the project corridor shall be delivered and installed prior to the start-up of the work.

C. Schedule the work to cooperate fully with residential and business property owners abutting the project to minimize the time of restricted access to their property during the construction period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 MOBILIZATION

A. Move personnel, equipment, materials, and all other items required to complete the Work at the Site.

B. Establish Contractor offices, building, or other facilities necessary for Work on the Project.

C. Temporarily hold or relocate utilities and any miscellaneous structures, such as signs, power poles, guy wires, and mailboxes disturbed.

3.02 TEMPORARY WATER FOR CONSTRUCTION AND USE OF OWNER'S WATER SYSTEM

A. The City of Hudson prohibits the indiscriminate use of the City's water hydrants by persons other than City personnel.

B. No direct connection will be allowed from a hydrant to a tank truck or watering vehicle or hose.

C. Clean and thoroughly disinfect all containers and testing equipment to eliminate the possibility of contamination of the system.

D. Disinfect water mains and services consistent with Section 33 11 00.

E. In addition to these regulations, comply with requirements for installation and testing of City water mains and services as described below:

Phase 1: Utility projects consisting of sanitary sewer, water main, and storm sewer improvements:

1. Step 1 - Open Connections to Existing Mains and/or Fittings:
   a. Schedule shutdown and contact City Utility Department a minimum of 48 hours prior to performing Work. At this time, notify the City Fire Department of the intended shutdown. Abide with specific requirements for the Project that limits or defines certain hours that the shutdown maybe be performed.
   b. If water service is to be turned off, provide written notification to all affected property owners and customers at least 48 hours prior to the actual loss of service.
   c. The City Utility Department must open and close the existing valves for this part of the operation. If required, the City will be responsible for flushing the existing mains after the connection is completed; however, the Contractor shall assist the City as necessary.
2. Step 2 - Filling Newly Installed Water Mains Prior to Service Installation:
   a. Contact City Utility Department a minimum of 48 hours prior to having work performed. Taps of 1-inch diameter may be required in dead end plugs to relieve air from the system as part of the Project.
   b. The City Utility Department must fill all lines.
   c. Verify that all existing valves are off and that untested water is not able to enter the City system. Have all new valves in their system open to assure that all new mains are filled but that the water is contained within the new system.
3. Step 3 - Water Service Installation:
   a. All corporation stops shall be tapped with the main under water pressure at the 10 or 2 o clock position.
   b. Open all corporation stops and curb stops to bleed air and flush any dirt from the copper water line. Afterwards, close the curb stop, tail, and water tight seal per City detail plate SER-5.
      During the service installation activity, open and close existing main valve as necessary to maintain pressure for tapping and bleeding service lines only. The **Utility Representative** must be present at the time the Contractor re-pressurizes the mains.
4. Step 4 - Pressure and Conductivity Testing:
   a. Pressure and conductivity testing shall be performed as per the Contract Specifications and shall be performed in that order to assure mains are full of water for conductivity testing.
   b. All service lines shall be in place and on before the pressure test is administrated.
   c. Document and provide the City with static pressure readings obtained during the pressure testing procedure.
   d. Utility and/or Engineer Representative must verify all testing.
5. Step 5 - Flushing of Water Mains for Bacteria Test:
   a. Contact City Utility Department a minimum of 48 hours prior to performing Work. Utility Representative reviews with Contractor the sequence of lines and valves to operate to thoroughly flush system.
   b. City Utility Department must flush all water mains.
   c. Notify the Engineer Representative for the scheduling of water sample for bacteria test, which shall be pulled and tested by a Wisconsin certified independent testing firm.
6. Step 6 - Turning On New Mains into Existing Water System:
   a. All testing complete - pressure, conductivity, and bacteria accepted by the Engineer.
   b. Engineer completes required documentation notifying Public Works Department, Engineering Department, and Utility Department that the new system can be scheduled to be turned on.
   c. Engineer contacts the City Utility Department which must be present to turn on the new system for all mains. System shall be turned on within 7 calendar days of completion of passing tests.

d. Engineer Representative and City Utility Representative together turns on the new system for all mains. System shall be turned on within 7 calendar days of completion of passing tests.

F. Phase 2 - Street Construction and Restoration, Landscaping Work:
   1. Contractors, subcontractors, builders, or developers are not allowed to operate or connect to a City's hydrant for water usage without a hydrant use permit.
   2. City water for street construction, restoration, and landscaping work is as follows:
      a. Hydrant Use Permit available at Utility Department located at 1201 Livingston Road. Office hours 8 A.M. to 3:30 P.M. A deposit is required for the use of a hydrant meter and a monthly rental fee will apply. These costs will be per the current City fee schedule. The charge for water used will also be per the current City fee schedule.
      b. If hydrant meters are not available or if the City determines the Contractors request for water warrants it, there is a 24-hour fill station at 888 O'Neil Road. Tokens for the fill station must be obtained from 1201 Livingston Road.
      c. Prices and deposit amounts may change without notice.

G. Water Restrictions: Contractor may be required to use non-potable water during a drought period. Owner will assist Contractor in locating source.

3.03 CONSTRUCTION FACILITIES

A. Sanitary Facilities:
   1. Comply with all governing regulations, including safety and health codes, for sanitary fixtures and facilities.
   2. Provide self-contained toilet units, or water and sewer connected temporary toilet facilities, consistent with governing regulations. Contractor may not use Owner's toilet facilities.
   3. Provide and maintain adequate supply of toilet tissue, paper towels, paper cups, and similar disposable materials appropriate for each facility. Provide appropriate covered waste containers for used material.

3.04 TEMPORARY CONSTRUCTION

A. By Pass Pumping:
   1. All sanitary flows shall be pumped around areas with no spillage allowed.
   2. Any spill needs to be reported as required by law.

B. Pumping and Dewatering:
   1. Provide draining, pumping, dewatering, and cleaning operations necessary to complete the Work.
   2. Provide all necessary pumping to remove all surface water and groundwater from structures as required for the Work. Provide erosion control measures for discharge of water.
   3. Protect Site and adjacent property to avoid damage.

3.05 TRAFFIC CONTROL

A. General:
   1. Provide and maintain all traffic control devices in accordance with the approved Construction Staging Plan. All traffic control devices and other protective measures shall conform to the WMUTCD, latest edition.
   2. Do not park vehicles as to obstruct a traffic control device. The parking of workers' vehicles will not be allowed within the Project limits, unless so approved by the Engineer.

3. Do not store materials or equipment within 30 feet of through traffic, unless approved by the Engineer. If materials or equipment must be stored within 30 feet of through traffic, the Contractor shall provide barricades or barriers, as directed by the Engineer, to warn and protect traffic.
4. Conduct Work in a manner that will allow access to all properties within and adjacent to the Project by fire, police, and emergency vehicles.
5. Maintain all unpaved surfaces. The surface shall be watered and bladed as directed by the Engineer.
6. Remove traffic control devices at the conclusion of the Work.
7. Flaggers are required to protect construction vehicles during unloading of construction materials. Conform to the requirements of the WMUTCD, latest edition.
8. Protect work at all times, including during the structure adjustment work.
9. Provide access for emergency vehicles and busses to all residences at all times.

B. Traffic Control Devices:
1. Daily inspect and insure that all traffic control devices required by the construction are in accordance with the WMUTCD, latest edition. Any discrepancy between the actual devices in use and the required devices shall be immediately rectified. At least 1 nighttime inspection shall be made each week.
2. Furnish names, addresses, and phone numbers of at least 3 individuals responsible for the placement and maintenance of traffic control devices. At least 1 of these individuals shall be "on call" 24 hours per day, 7 days per week during the time any traffic control devices furnished and installed by the Contractor are in place.
3. Respond to any request from the Engineer to improve or correct the usage of traffic control devices on or related to this Project within 1 hour of the time of notification or be subject to a $100 per hour deduction from the time of notification for non-attention.
4. Keep all traffic control signs and devices in a legible condition. This shall include but not be limited to removing grime and dust deposited on any device by traffic, natural causes, or when requested by Engineer.
5. Store at least 10 extra Type 1 barricades with flashers, 5 extra Type III barricades, and 10 extra drums, at a convenient location within the Project limits for use in an emergency, as approved by the Engineer. No direct compensation will be made to the Contractor for furnishing and erecting these traffic control devices.

C. Place traffic control with flashers around areas disturbed by removal and replacement of utility structures and concrete curb and gutter:
1. Place at least one Type 1 barricade with flasher or barrel with flasher per panel of curb removed.

D. Establish and maintain advisory signs at all entrances to Site:
1. Signs shall state "Construction Zone" and "Proceed at Own Risk" in black letters on orange background.

E. Prior to disturbing any existing trail or sidewalk, place Type 3 barricade with "Sidewalk Closed" sign on each side of the disturbed area.

F. Closure of a roadway using Type III barricades will require a sufficient number of barricades to span the entire roadway width, at the discretion of the Engineer.

3.06 TEMPORARY BARRIERS AND ENCLOSURES

A. Temporary Barriers:
1. Provide temporary covers, enclosures, markers, and barriers as necessary to protect Work.

2. Promptly repair any damage to the Site caused by removal of temporary fencing, including postholes. During removal, at no time shall the Work remain unattended if a dangerous condition exists because of incomplete removal or Site requiring repair.

B. Temporary Fence:
   1. Install as shown on the Drawings.
   2. Maintain and repair fence throughout the duration of the Project.
   3. Provide Owner and Engineer with keys or combinations to any locks that may be used to secure fencing gates.

3.07 RESTRICTIONS

A. Temporary stockpiling of materials or debris on any City street overnight is not allowed. Proper traffic control is required for stockpiling during the day.

B. Overnight parking of equipment will not be allowed on any City street. Proper traffic control is required for parking during the day.

END OF SECTION

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Temporary utility services and facilities including, but not limited to:
   1. Temporary water supply system.
   2. Construction water.
   3. Sanitary facilities.
   4. Sewers and drainage.

B. Related Requirements:
   1. Section 33 11 00 – Water Distribution Systems

C. Measurement and payment
   1. Temporary Water Supply System:
      a. Lump Sum.
      b. Includes traffic control and erosion control devices required by state and local regulations.
      c. Disinfection and header pipe ramping and trenching shall be considered incidental.

   2. Sewer Bypass Pumping: Incidental to proposed applicable permanent utility improvements.

   3. Temporary Drainage: Incidental to applicable earthwork pay item.

1.02 REFERENCES

A. ANSI - A10 Series Safety Requirements Standards

B. NSF/ANSI 61: Drinking Water System Components – Health Effects

C. AWWA - C651 Disinfecting Water Mains

D. FM Global

E. NECA - NJG-6 - Temporary Job Utilities and Services

F. NEMA

G. NFPA:
   1. 70 - National Electrical Code
   2. 241 - Safeguarding Construction, Alteration, and Demolition Operations

H. Underwriter's Laboratory (UL)

1.03 DEFINITIONS

A. Utility: Refers to the City of Hudson Public Utilities

1.04 COORDINATION

A. Contractor shall coordinate tests and inspections required by state and local health departments and AWWA C651.

B. Utility interruptions required for tie-ins:
   1. Determine requirements, time constraints, etc. for installing temporary service to the Site, or to make connections to existing service.
      a. Shall be requested by Contractor in writing to Utility.
      b. Shall not commence until Contractor has received written response from Utility.
      c. Utility reserves the right to restrict the time and duration of interruption.
   2. Arrange with utility companies for service interruption, where necessary, to make connections for temporary services.

1.05 SUBMITTALS

A. Submit an overall Temporary Water Supply System Plan for approval within 10 days after award of Contract and no less than 5 days prior to initiating any construction. The Temporary Water Supply System Plan shall include:
   1. Proposed materials and pipe sizes.
   2. Proposed staging and operations plans.

1.06 QUALITY ASSURANCE

A. Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary utilities and related services.

B. Comply with requirements of NSF/ANSI 61, NECA NJG-6, NFPA 241, ANSI A10, AWWA C651 Series Standards.

C. Where local laws and regulations conflict with the requirements of NEMA, NFPA, ANSI, or AWWA, comply with the most restrictive requirements.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Provide all required materials and equipment for temporary utilities, services, and facilities.

B. Used materials and equipment may be used, if acceptable to Utility.

C. Provide only materials and equipment that are suitable for intended use and comply with appropriate standards.

2.02 UTILITIES

A. Where local utility company provides only a portion of temporary utility, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations and requirements.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide each temporary service and facility ready for use at each location when service or facility is first needed.

B. Locate temporary utilities where they will serve Project and result in minimum interference with performance of the Work.

C. Locate temporary utilities where they will allow ADA accessibility to all adjacent properties.

D. Maintain, relocate, modify, and extend utilities as required during course of Work.

E. Use qualified tradepersons for installation of temporary utilities.

3.02 TEMPORARY WATER SUPPLY SYSTEM

A. During construction, maintain potable water service to existing users on a continuous basis until service from newly installed mains can be constructed, tested, and placed into service.

B. Utility will pay for water used in the temporary water distribution system.

C. Provide minimum 48-hour notice to Utility, Engineer and all affected property owners prior to service disruption.

D. Connection to water supply shall be approved by Utility where usage can be metered and system sanitation can be maintained.

E. Coordinate installation with Utility staff.

F. Verify location of and obtain temporary water supply at or near site and install piping, hoses, fittings, etc. required to distribute it as required by the Work.

G. Contractor shall make all connections including flushing of existing water meters.

H. Maintain temporary distribution system to avoid damage to existing or new permanent distribution system.

I. Damages to existing or new permanent distribution systems related to connection of temporary water supply system shall be corrected and paid for by the Contractor.

J. Damages to permanent plumbing related to temporary building connections shall be corrected and paid for by the Contractor.

K. Disinfect temporary service lines, headers, connections, and appurtenances in accordance with Wisconsin Department of Natural Resources and AWWA C651 rules and regulations and with paragraph 3.03 prior to being placed into service.

L. Protect temporary water system from freezing.

3.03 CONSTRUCTION WATER

A. Owner will pay for water used for construction purposes.

B. Secure water necessary for construction and testing and pay service connection charges.

C. Install water service and distribution piping of sizes and pressures adequate for construction purposes.

D. Where available supply of potable water is inadequate, provide non-potable water for purposes other than drinking and washing.

E. Where non-potable water is used, provide warning signs on the discharge end of each length of hose and at the shut-off nozzles.

F. Where shut-off nozzles are used at water hose discharge, provide heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system.

G. Trades needing a larger source of water are responsible for the source and distribution.

H. Exercise control over usage to conserve water.

I. Sterilize temporary water piping for potable water prior to use as follows:

1. Disinfect all temporary mains, header pipes, services and appurtenances in accordance with AWWA C651.
    a. Granular or Continuous Feed Method:
        1) Hold chlorine solution in pipe for a minimum period of 24 hours.
            a) Initial dosage: 50 ppm minimum.
            b) Residual dosage after hold period: 10 ppm minimum.

J. Flush temporary system 24 – 48 hours after initial dosage of chlorine (contact time 24-48 hours).

K. Sampling and Testing:
1. Obtain samples a minimum of 24 hours after final flushing as follows:
    a. One sample for every 1,200 feet of main.
    b. One sample at each dead-end.
    c. Ensure that 1 sample is obtained from each branch of main.
    d. Minimum sample required: 2
2. Perform coliform tests on each sample.
3. Rechlorinate if any sample tests positive for coliform.
4. Provide accepted coliform testing results to Utility and Engineer prior to connection of temporary water system to existing properties or services.

L. Maintain distribution system to avoid damage to existing or new construction.

M. Avoid damage to permanent plumbing at source of temporary water.

3.04 SANITARY FACILITIES

A. Provided by Contractor for workers engaged in this Work.

3.05 SEWERS AND DRAINAGE

A. Temporary Sanitary Sewer Service:
1. During construction, maintain flow in sanitary sewers and force mains on a continuous basis until service from newly constructed mains can be restored.
2. Provide pumps, portable generators, hoses and related items appurtenant to the Work.
3. When necessary to pump sewage overnight, provide an operator to stay with the pumping operation until construction resumes the next day.
4. Sewer service lines to individual users may be disconnected for a period not to exceed 4 hours in any one day. Service disconnection to be scheduled to minimize inconvenience to users.
5. Operate temporary service in a safe and efficient manner, do not overload or allow unsanitary conditions, public nuisances, or hazardous conditions to develop or persist on the Site.

B. Temporary Storm Sewer Service:
1. If existing sewers are available for temporary drainage near Site prior to completion of permanent sewers, provide temporary connections to remove effluent that can be lawfully discharged into sewers.
2. If existing sewers cannot be used for discharge, provide drainage ditches, dry wells, waste stabilization ponds, and similar discharge facilities to remove effluent that can be lawfully discharged in that manner.
3. If neither existing sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.

C. Before discharge into sewers or drainage facilities, filter out excessive amounts of soils, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways.

D. Provide temporary filter beds, settlement tanks, separators, and similar devices if necessary.

E. Maintain temporary sewers and drainage facilities in a clean, sanitary condition.

F. Provide and maintain temporary earthen embankments and similar barriers in and around construction excavations and subgrade construction, sufficient to prevent flooding.

3.06 OPERATION, TERMINATION, AND REMOVAL

A. Enforce strict discipline in use of temporary services and facilities at the Site.
   1. Limit availability of temporary services and facilities to essential and intended uses to minimize waste and abuse.
   2. Do not permit temporary installations to be abused or endangered.
   3. Do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on Site.

B. Operate temporary services and facilities in a safe and efficient manner.
   1. Do not overload temporary services or facilities.
   2. Protect from damage by freezing temperatures and similar elements.
   3. Prevent water-filled piping from freezing by use of ground covers, insulation, draining, or by temporary heating.
   4. Maintain distinct markers for underground lines.
   5. Protect from damage during excavation operations.

C. Unless Utility requests that it be maintained for a longer period of time, remove each temporary service and facility promptly when no longer needed, when it has been replaced by the authorized use of a permanent facility, or no later than Substantial Completion.

D. Complete or restore permanent Work which may have been delayed because of interference with temporary service or facility.

E. Repair damaged Work, clean exposed surfaces, and replace Work which cannot be satisfactorily repaired.

F. Materials and facilities that constitute temporary services and facilities are, and will remain, the property of Contractor.

G. At Substantial Completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during construction, including but not limited to:
   1. Replace significantly worn parts and parts that have been subject to unusual operating conditions.

END OF SECTION

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SECTION 01 54 28

EQUIPMENT RENTAL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Furnishing labor and/or specific equipment with operators as required.

B. Related Sections:
   1. Section 01 57 13 – Temporary Erosion and Sediment Control
   2. Section 32 12 01 – Flexible Paving

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Equipment:
      a. Measurement will be by time in hours and will only include actual working time and travel time within the Project limits for each equipment type.
      b. Payment shall include one operator and active equipment as required. Payment for labor and equipment shall be at the Contract unit price as listed on the Bid Form. All associated work items shall be considered incidental.
   2. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 PERFORMANCE REQUIREMENTS

A. All equipment and accessories shall be fully operational and in good mechanical condition.

B. All equipment operated on asphalt or concrete surfaces shall be equipped with rubber tires or smooth street plates.

C. Equipment provided shall be rated for, and have sufficient power to effectively complete the work as required.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Provide the following equipment, as requested by Engineer, which meets the specific requirements and includes the accessories listed:
   1. Street sweeper with mechanism for picking up and containing sweepings. Power broom will not be allowed. The Street Sweeper shall have the minimum bristle length as recommended by the manufacture.
   2. Skidsteer (bobcat).
   3. Wheel-type end loader, minimum 50 hp
   4. Track-type dozer, minimum 80 hp
   5. Dump Truck, minimum tri axle with tandem drive axle assembly

PART 3 EXECUTION

3.01 GENERAL

A. Perform work as requested by Engineer.

B. Perform street sweeping per Section 01 57 13 and 32 12 01.

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Managing storm water runoff and other Project related water discharges to minimize sediment pollution during construction.

B. The Contractor and Owner shall identify a person(s) knowledgeable and experienced in the application of erosion and sediment control BMP's who will oversee the implementation of the SWPPP.

C. Wisconsin Department of Natural Resources (WisDNR) – Wisconsin Pollutant Discharge Elimination System (WPDES) Construction Site Storm Water General Permit:
   1. The Owner has developed a Storm Water Pollution Prevention Plan (SWPPP) in accordance with WPDES. The SWPPP is included in the project plans.
   2. As a condition of the Award, the Contractor shall be a co-permittee and assume the role of "Operator" under the WPDES Permit.
   3. The Owner will initiate the permit and pay the required fee.
   4. For storm water discharges from construction activities where the Owner or Operator (Contractor) changes, the new Owner or Operator can implement the original SWPPP created for the project, implement an amended version of the original SWPPP, or develop and implement their own SWPPP.
   5. Permittee(s) shall ensure that their SWPPP meets all terms and conditions of this permit and that their activities do not render ineffective another party's erosion prevention and sediment control Best Management Practices (BMP's).
   6. The Contractor shall maintain copies of the SWPPP on the project site at all times and comply with all provisions contained therein, including performing the required inspections of the erosion control devices and maintaining an Inspector's Log for the MPCA Storm Water Permit. An Inspector's Log form is attached to these specifications.
   7. The Contractor shall be responsible for keeping the on-site SWPPP documents current and updated to reflect changing conditions as construction progresses.
   8. Process Summary:
      a. Owner issues *Notice of Award* to Contractor.
      b. The Contractor shall review the SWPPP and may propose changes or a new SWPPP to the Engineer and Owner for review, comment, and Authorization. Changes may be recommended by the Contractor, Engineer, and/or Owner at any time during the construction period to address changing conditions.
         1) The responsibility for SWPPP amendments proposed by the Contractor lies with the Contractor. If the Engineer and/or Owner authorize the revisions with no exception taken, such action shall not absolve the responsibilities of the Contractor in any way.
         2) During the review and modification period, on-site Erosion Control shall comply with or exceed the current SWPPP. Pending review by the Engineer and/or Owner shall not alleviate the Contractor's responsibility to install necessary BMP's to address site issues.
         3) Once a SWPPP is modified and/or amended, the Contractor shall distribute new copies to the Owner, the Engineer, the on-site project supervisor and the resident project representative.

c. Contractor acknowledges the *Notice of Award* and provides the Owner with the contact information for the Contractor's designated SWPPP contact to be used by the Owner for the on-line Stormwater Permit Application. Required information includes; Name, Title, Business Mailing Address, Phone Number and Email for the designated individual.
d. Within 7 days of acknowledgement of the Notice of Award by the Contractor, the Owner shall submit the On-line Stormwater Permit Application to the WisDNR.
e. Work shall follow the sequence of major activities outlined in the SWPPP.
f. All permittees, contractors, and subcontractors involved with erosion control and stormwater management shall obtain a copy of the erosion control and stormwater management plan and the State of Wisconsin National Pollutant Discharge Elimination System (NPDES Phase II) Permit and become familiar with their contents and is responsible to comply with all requirements stated within.
g. The BMP's shown on the plans are the minimum requirements for the anticipated site conditions. As construction progresses, the permittee/contractor shall anticipate that additional BMP's may be required as site conditions change and shall provide additional BMP's to meet applicable requirements.
h. All work and materials shall be constructed according to the approved plans and erosion control and stormwater management plan. Any deviation from the approved plans shall require written approval from the owner

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Payment at the Bid Unit Price will be considered compensation in full for all Work necessary to complete the Bid Item in full, including installation, maintenance, sediment removal, repairs, and removals.
2. Measurement will be based upon the units as listed below for Bid Items removed, abandoned, or salvaged complete as specified. No measurement will be made of any removals that are not required. The actual quantity installed multiplied by the appropriate Bid Unit Price will be compensation in full for all Work and costs of the following Bid Items. 80-percent partial payment will be made upon installation and 20-percent payment will be made upon removal and restoration:
a. Silt Fence: Payment will be by type. Measurement will be by the linear foot along the base of the fence, from outside to outside of the end posts for each section of fence.
b. Floatation Silt Fence: Payment will be by type. Measurement will be by linear foot installed.
c. Storm Drain Inlet Protection: Measurement will be per each, according to type furnished, installed, maintenance, including cleaning and reinstallation.
d. Temporary Construction Entrance: Measurement will be by the cubic yard of material furnished and installed on the Project.
e. Erosion Mat: Payment will be by type installed. Measurement will by square yard.
f. Mulch: Measurement will be by the acre of material installed.
g. Temporary Hydraulic Matrix: Measurement will be by the acre of material installed.
h. Ditch Check: Payment will be by type. Measurement will be by the linear foot.
i. Sediment Control Logs: Payment will be by type. Measurement will be by the linear foot.
j. Sediment Trap: Shall be considered incidental to the Project.
k. Temporary Pipe Downdrains: Measurement will be by the linear foot. Payment shall include rip rap used to provide an outlet.
l. Bale Barrier: Measurement will be by the linear foot.
3. Water for Dust Control: Measurement will be per 1,000 gallons (Gal) applied to the street. Payment will constitute compensation in full for all Work and cost to furnish and install the Water. This Bid Unit Bid Item is intended to pay for water used for dust control only and only at those times that it is requested by either the Engineer or Owner:
a. Water used for the construction of the streets will be considered incidental to the Project.

4. Street Sweeper With Operator and Skidsteer (Bobcat) With Operator: Measurement shall be by the hour of equipment use, based on the actual amount of time spent cleaning street surfaces. However, if the Contractor is careless in their construction operations, they will be required to clean and sweep streets at their own expense. Payment at the Unit Price shall be considered complete compensation for all work associated with the cleaning, including water as directed by Engineer, and disposal of collected materials:
   a. Anticipate multiple mobilizations to perform this work.
5. Erosion Control Supervisor: No measurement will be made of the various duties performed or of the number of hours required, but all such work will be construed to be included in the lump sum payment, half to be paid after 50% of the project is complete and the remainder at closeout of the project. The bid item is for providing an Erosion Control Supervisor throughout the duration of the project to perform all duties as described in Section 1.05.A.
6. When the contract Bid Item requires maintenance, partial payment for installation will be made no greater than 50 percent of the contract unit price. The remaining partial payment will be made after maintenance and final acceptance by the Engineer.
7. The furnishing and installing of specific items and/or the performance of work under certain circumstances shall not be individually paid in the absence of a specific bid item for the work. The costs shall be included in the unit price bid for the associated erosion control and excavation items. Such items of work include but are not limited to:
   a. Complying with the Wisconsin Department of Natural Resources (WisDNR) – Wisconsin Pollutant Discharge Elimination System (WPDES) Construction Site Storm Water General Permit – Reference Storm Water Pollution Prevention Plan (SWPPP) included in the Appendix or in the drawings.
   b. Providing trained Construction SWPPP Manager and BMP Installer.
   c. Inspect, maintain, repair, and remove (if necessary) temporary surface stabilization practices throughout the duration of the project.
   d. Maintaining clean exit areas or roads from the site.
   e. Cleaning storm sewers, drain tiles and culverts that have been partially or completely obstructed by sediment that originated from the site.
   f. Emergency erosion control mobilization.
8. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

B. Related Sections:
   1. Section 32 92 00 – Turf and Grasses.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WISDOT Spec.):
   1. Section 627 - Mulching
   2. Section 628 – Erosion Control

B. Wisconsin DNR Storm Water Management Technical Standards

C. Wisconsin DNR Chapter NR 151 – Runoff Management

D. Unless noted otherwise, the provisions in this section are in addition to the referenced specification.

1.04 SUBMITTALS

A. Requested changes, revisions, and supplementary information to the SWPPP, including but not limited to):
   1. Contact information and training documentation for Construction SWPPP Manager and BMP Installer.
   2. Locations for Stockpiles, Concrete Washout, and Sanitation Facilities.
   3. Changes to types and/or locations of Best Management Practices.

B. Contractor Prepared Schedules and Plans:
   1. Erosion Control Schedule: submitted each week that construction is active.
   2. Site plans:
      a. Submitted when requested by the Engineer.
      b. Site plans prepared by Contractor will indicate Contractor operations, erosion and sediment control measures, and a schedule of starting and completion times.

C. Certification and Sampling:
   1. Furnish a manufacturer's certification stating that the material supplied conforms to the requirements of this Section. The certification shall include or have attached typical results of tests for the specified properties, representative of the materials supplied.

1.05 SEQUENCING AND SCHEDULING

A. Install sediment control measures prior to grading activities.

B. Schedule and coordinate the Work so that permanent erosion and sediment control BMPs, such as basin construction, rip rap placement, and permanent seeding, are directly incorporated into the supplement permanent erosion and sediment control BMPs with temporary BMPs. Place temporary BMPs when permanent erosion control cannot be achieved. Coordinate construction operations so that erosion and sediment control measures (permanent or temporary) are installed and maintained concurrently with the rest of the Work of the Project.

C. Coordinate and schedule the Work of subcontractors such that erosion and sediment control measures are fully executed for each operation and in a timely manner over the duration of the Project. Develop a chain of responsibility for all subcontractors and operators on the Project to ensure that permit provisions are adhered to.

D. Infiltration areas and constructed infiltration systems should not be constructed until the contributing drainage area and/or adjacent construction has been completely stabilized. When this timing of construction is not possible, insure sediment from exposed soil areas of the Project does not enter into the infiltration area or system.

E. Stabilization timeframes shall conform to the WPDES Construction Site Storm Water General Permit.

F. Perform weekly and post-rainfall event inspections in accordance with the WPDES permit.
   1. Complete and submit the required weekly inspection log.

G. Prior to Project shutdown for the winter or other periods of a week or more, adequately protect Site from erosion and off-Site damage by covering exposed soils with mulch and establishing perimeter controls.

H. If the Contractor fails to install erosion or sediment measures, the Engineer may withhold payment from related work until the control measures are undertaken by the Contractor:
   1. When the Contractor fails to conduct the quality control program, does not conduct the inspection required in the WPDES permit, or fails to take action ordered by the Engineer to remedy erosion or sediment control problems, the Engineer shall issue a Written Order to the Contractor.
   2. Respond within 24 hours with sufficient personnel, equipment, materials, and conduct the required Work or be subject to a $1,000 per calendar day deduction for noncompliance.

I. Establish permanent turf in accordance with Section 32 92 00 to prevent excessive soil erosion.

J. Multiple mobilizations will be required for the various erosion and sediment control items.

K. Silt fence shall be removed prior to project closeout and final acceptance.

PART 2 PRODUCTS

2.01 For all materials not specifically discussed below no exceptions to the referenced specification are made.

2.02 SILT FENCE:

A. Conform to WisDOT Section 628.2.6 and City Standard Detail Plate ERO-2.

2.03 TEMPORARY CONSTRUCTION ENTRANCE

A. Rock Construction Entrance: Conform to City Standard Detail Plate ERO-1:
   1. 2 inches minimum clear/washed rock.
   2. Underlying Geotextile: Conform to WisDOT Section 645, Type R.
   3. Minimum Thickness of Rock Placed: 6 inches.

B. Wood Slash Mulch Construction Entrance: Conform to City Standard Detail Plate ERO-1:
   1. Raw wood slash only. No chipped-up manufactured wood or chemically treated wood is allowed.
   2. Splinter material to an average approximate length of 6 inches with a maximum length of 20 inches. Bark and wood splinters less than 2 inches long shall not exceed 20 percent by mass of the material.
   3. Underlying Geotextile: Conform to WisDOT Section 645, Type R.
   4. Minimum Thickness of Mulch Placed: 18 inches.

2.04 MULCH: Conform to WisDOT Section 627:

A. Straw or hay only. Project specific, refer to WisDOT Spec. for options.

B. Hydraulic erosion control products may be used in lieu of mulch with the approval of the Engineer.

2.05 SOIL STABILIZER

1. Conform to Section 32 92 00.

2.06 EROSION MAT

1. Class 1, Urban, Type B

2. Conform to City Standard Detail Plate ERO-4.

2.07 STORM DRAIN INLET PROTECTION

A. Inlet protection for paved streets with concrete curb and gutter: The following methods are acceptable:
   1. Conform to the details on the Drawings.
   2. Catch Basin Inserts:
      a. Road Drain by Wimco, LLC (www.roaddrain.com), in accordance with City Standard Detail Plate ERO-8.
      b. Lange Industries (www.langeindustries.com), or approved equal.
      c. Filter bag insert subject to Site and approved by the Engineer.

B. Inlet protection for non-paved surfaces without curb or areas where vegetation will be established. The following methods are acceptable:
   1. Conform to the details on the Drawings.
   2. Silt fence box: conform to City Standard Detail Plate ERO-5 and ERO-6, or approved equal.
   3. Sediment control inlet hat:
      a. InfraSafe Sediment Control Barrier by Royal Enterprises (http://www.royalenterprises.net/).
   4. Pop-up head.
   5. Rock filter: conform to City Standard Detail Plate ERO-7 as shown on the Drawings.

2.08 SEDIMENT CONTROL LOGS

A. Straw or wood fiber biorolls, 6 to 7 inches in diameter.

B. Compost or rock logs, 6 to 8 inches in diameter.

2.09 DITCH CHECKS

A. Conform to WisDOT Spec. 628.3.14 and details in Drawings.

2.10 BALE BARRIERS

A. Conforming to WisDOT Section 628.4.

B. All bales shall be either bound with wire or tied with nylon string.

C. Hardwood stakes shall be 1-1/2 inches by 1-1/2 inches by 36 inches.

2.11 FLOATATION SILT CURTAIN

A. Conform to the requirements of WisDOT Section 628.2.7.

B. Curtain depth shall extend to the bottom of the water body.

2.12 DUST CONTROL

A. Water clear and free from suspended fine sediment.

2.13 TEMPORARY SEED

A. Conform to Section 32 92 00.

2.14 DEWATERING SEDIMENT CAPTURE

A. General – Sizing, configuration, capacity, and selection of dewatering sediment capture techniques shall be based on Site and flow conditions. Submit the means and methods for review by the Engineer. Sizing of the sediment capture systems will have to be adjusted such that the ultimate discharge water is not visibly different from the receiving water.

2.15 EQUIPMENT

A. Street sweeper with mechanism for picking up and containing sweepings. Power broom will not be allowed. The Street Sweeper shall have the minimum bristle length as recommended by the manufacture.

B. Skidsteer (bobcat) to assist in street sweeping.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with all applicable laws, ordinances, regulations, permit requirements, orders and decrees pertaining to erosion/sediment control and stormwater discharge during the conduct of the Work.

B. Take necessary precautions against damage to the Project by action of the elements.

C. Implement the Project's WPDES Stormwater Pollution Prevention Plan (SWPPP) and take necessary actions to prevent off Site damage resulting from Work conducted on the Project or Project related stormwater runoff.

D. Minimize the amount of disturbed land that is susceptible to erosion at any time. Delineate areas not to be disturbed:
   1. Exclude vehicles and construction equipment from area not to be disturbed to preserve natural vegetation.
   2. Maintain and preserve riparian and naturally vegetated buffer strips (10 feet minimum distance) along water courses.

E. Restore all disturbed areas that have not had construction activity for more than 14 calendar days with temporary soil stabilizer per Section 32 92 00. All costs related to furnishing and installing the temporary soil stabilizer will be considered incidental to the Project.

F. Street sweeping operations must include the application of water to effectively remove fine materials from pavement areas, as directed by the Engineer. The appropriate amount of water shall be applied to eliminate dust as part of the sweeping operations.

3.02 INSTALLATION

A. General: Install temporary stormwater management and sediment control devices in conformance with the details, typical sections, and elevations shown on the Drawings.

B. The location of temporary stormwater and sediment control devices may be adjusted from that shown on the Drawings to accommodate actual field conditions and increase the effectiveness of the installation.

C. Silt Fence: Conform to WisDOT Spec. 628.3.4:
   1. Install in the locations shown on the Drawings, unless directed otherwise by the Engineer.
   2. Use additional measures, such as rock aggregate, placed along the base of the silt fence where the silt fence geotextile cannot be trenched in, i.e. tree roots, frost, bedrock.
   3. Use short sections of silt fence placed in J-hook patterns to:
      a. Supplement the perimeter silt fence at corner locations and areas where sediment deposition will occur. No more than 100 feet of silt fence shall be installed per 1/4 acre of drainage.
      b. Break up flow path along silt fence running across contours to be no more than 100 feet between hooks or as directed by the Engineer.
   4. Silt fence longer than 600 feet shall be constructed in separate independent units with each unit having a length less than 600 feet. Avoid splices whenever possible. If necessary, make splices at an opposing fence post and according to the manufacturer's specifications.

D. Temporary Construction Entrance:
   1. Install at locations shown on the Drawings.
   2. Construct construction entrance before grading begins on the Site.
   3. Inspect construction entrance daily for mud accumulation to minimize vehicle tracking of sediment onto public roadways. Remove fugitive rock or wood mulch from adjacent roadways daily.

E. Mulch:
   1. For seeded Sites, apply at a rate of 2 tons per acre (4,500 kg/ha).
   2. For unseeded Sites, apply at a rate of 2 to 3 tons per acre (4,500 to 6,700 kg/ha), covering the entire soil surface.
   3. Distribute mulch evenly by hand or machine and cover the exposed area to a uniform depth.
   4. Conformance to WisDOT Sect. 627.3.2.3, Method C
   5. Anchor mulch immediately to minimize loss by wind or water.

F. Temporary Soil Stabilizer:
   1. Conform to WisDOT Spec. 628.3.12.2, Type A, but without seed.

G. Slope (Cat) Tracking:
   1. Slope tracking consists of operating a dozer up and down slopes so that the cleats of the tracks create grooves perpendicular to the slope. By operating the dozer up and down, the soil surface is firmed and miniature interceptor checks are created.
   2. Required on all slopes equal to or steeper than 3:1 (H:V).

H. Erosion Mat:
   1. Install immediately following seeding in accordance with WisDOT Spec. 628.3.2, and as modified below:
      a. Install per Detail Plate ERO-4 as shown on Drawings.
      b. Raking or harrowing of soil/seed shall be done before installation of erosion control blanket.
      c. Install blanket parallel to the direction of flow.
      d. If permanent seeding is not available at the time of blanket installation, this material will have to be removed, re-seeded, and installed again as a permanent erosion control measure. If permanent seeding is available at the time of initial installation, a one-time proper installation is acceptable.

I. Storm Drain Inlet Protection:
   1. Provide effective storm drain inlet protection over the life of the Project until all sources with potential for discharging to inlets have been paved or stabilized.
   2. Place devices so that driving hazards or obstructions are not created. The devices must be cleaned out regularly and all devices must have an emergency overflow to reduce flooding potential.

J. Temporary Sediment Basins:
   1. Sediment basins shall be excavated as a first priority when grading begins on the Project. The location and outlet configuration are shown on the Drawings.

K. Temporary Sediment Traps:
   1. Temporary sediment traps are excavated in conjunction with other grading activities. Temporary traps are approximately 2 feet or less in depth with a length to width ratio of 2:4.
   2. Effectiveness of sediment traps can be increased by placing a rock weeper at the outlet.

L. Temporary Diversion Berm:
   1. Temporary diversion berm shall be installed at locations shown on the Drawings. The berm shall be located to minimize damage by construction operations and traffic.
   2. Temporary diversion berm shall be installed as a first step in the land-disturbing activity and must be functional prior or in conjunction with upslope land disturbance.
   3. The berm shall be adequately compacted to prevent failure.
   4. Temporary or permanent seeding and mulch shall be applied to the berm immediately following its construction.

M. Ditch Checks and Velocity Checks: Reference detail on Drawings.

N. Floatation Silt Curtain:
   1. Floatation silt curtain shall be installed in locations shown on the Drawings and according to the manufacturer's specifications:
      a. "Anchor" and secure to prevent any material from passing beneath, over, around, or through the barrier.
      b. Provide sufficient slack to permit the curtain to rise to the maximum expected high-water level, including wave action, without being overtopped and still be in continuous contact with the bottom.
   2. Place floatation silt curtain as close to the shoreline or work area as possible. Flotation silt curtain shall not be placed across flowing rivers, streams, drainage ditches, or across culvert inlets or outlets.

3.03 MAINTENANCE

A. Conform to WisDOT Section 628, WPDES permit, and as follows:
   1. Inspect, maintain, and repair any washouts or accumulations of sediment that occur as a result of the grading or construction. Restoration consists of grade repair, turf re-establishment, and street sweeping of mud and debris tracked from the Site.
   2. Inspection of all erosion and sediment control items will take place immediately after each runoff event and at least daily during prolonged rainfall. Make any required repairs immediately.
   3. Maintain the temporary sediment control devices until they are no longer necessary and are removed:
      a. Maintenance consists of keeping the devices functioning properly.
      b. Repair or replace plugged, torn, displaced, damaged, or non-functioning devices.

4. Upon final acceptance of the Project and establishment of permanent erosion control measures, remove all temporary erosion control measures:
    a. Catch basin protection becomes property of Contractor.
5. Temporary soil stabilizing is very effective at controlling erosion. However, it is considered a temporary measure and may need to be re-established several times throughout the duration of the Work.
6. Floatation silt curtain shall remain in place until such time that water contained within is free from turbidity:
    a. Remove curtain within 72 hours after this determination has been made.
    b. At the completion of the Project, remove floatation silt curtain in such a manner so as to minimize release of sediment adhering to the turbidity curtain.

B. Sediment Removal:
1. Remove sediment from erosion control devices when sediment reaches one-third of the height of the devices, restore such features to their original condition.
2. Established areas disturbed by the removal of sediment, will require finish grading and restoration with in-kind materials, such as area disturbed as part of silt fence removal. This work shall be considered incidental to the specific bid item.

C. Control dust blowing and movement on Site and roads as directed by Engineer to prevent exposure of soil surfaces, to reduce on and off-Site damage, to prevent health hazards, and to improve traffic safety.

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Requirements for overall execution of the Work and closeout of the Contract for Final Payment.

B. Measurement and Payment:
   1. All Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.02 SUBMITTALS

A. Submit the following items consistent with the Conditions of the Contract and Division 01 Sections:
   1. Written Notification of Substantial Completion.
   2. Executed Certificate of Substantial Completion.
   3. Written Notification of Final Completion.
   4. Spare Parts, Operation and Maintenance Manuals, instructions, schedules, warranties, guarantees, Bonds, certificates, certificates of inspection, and other documents.
   5. Final Application for Payment, including accompanying documentation:
      a. Lien wavers per paragraph 15.06.A.2 of the General Conditions
      b. Written proof of compliance with State income tax income tax withholding requirements per paragraph 15.4 of the Supplementary Conditions.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

A. Acceptance of Conditions: By commencing Work, Contractor construes acceptance of the adjacent work as satisfactory to receive subsequent work.

B. Existing Conditions: Before commencing Work, inspect work completed by others that is adjacent to Work. If adjacent conditions prevent completion of Work, Contractor will not commence Work until the conditions are corrected.

C. Inspect each product immediately prior to installation. Remove damaged products from Site.

3.02 GENERAL INSTALLATION REQUIREMENTS

A. Comply with the manufacturer's instructions for installation of manufactured products to the extent that these instructions are applicable and more explicit or more stringent than requirements indicated in the Contract Documents.

B. Secure Work true to line and level, within recognized industry tolerances, with anchorage devices designed and sized to withstand stresses, vibration, and rocking. Allow for expansion and movement of building.

C. Install each element of work during weather conditions and Project status to ensure coordination of the Work. Isolate each element of work from incompatible work as necessary to prevent deterioration.

D. Record installation details and prepare Record Documents consistent with the General Conditions.

3.03 SITE MAINTENANCE

A. Maintain stockpiles, excavations, access roads, and all other work areas free from dust. Employ dust abatement techniques whenever a dust nuisance or hazard occurs, or as directed by Engineer. Comply with local ordinances.

B. Protect hazardous work areas and hazardous material storage areas.

C. Protect trees, unless specifically indicated on Drawings.

D. Clean access roads and haul routes with mechanical street sweeper.

E. If Contractor fails to maintain Site, Engineer will provide Written Notice of Contractor's defective Work. Contractor will be given 12 hours from the Notice to clean Site. After the 12-hour period, Owner may correct the defective Work consistent with Article 14.07 of the General Conditions.

3.04 CLEANING AND PROTECTION

A. Clean and protect Work in progress and adjoining Work during handling and installation. Apply protective covering on installed Work where it is required to ensure freedom from damage or deterioration.

B. Clean and perform maintenance as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure operability without damage effects.

3.05 CUTTING AND PATCHING

A. Complete all cutting, fitting, and patching as necessary to join the new Work to existing conditions.

B. Remove or cut existing work only as necessary to join the new work to the existing construction or as required by the Contract Documents.

C. Patch defective and incomplete surfaces caused or exposed by Work of the Project.

D. Repair any damage to existing conditions and patch to match.

E. Existing construction designated by the Contract Documents to remain that is loosened, cracked, or otherwise damaged or defaced beyond repair as a result of Work by the Contractor will be considered unsuitable for the use intended and shall be removed and replaced by the Contractor.

END OF SECTION

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Complete or partial removal and disposal or salvage of at grade, above grade, and below grade structures and miscellaneous items.

B. Related Sections:
   1. Section 31 23 00 - Excavation and Fill.
   2. Section 32 13 14 - Concrete Walks, Medians, and Driveways.
   3. Section 32 16 13 - Concrete Curb and Gutters.
   4. Section 33 05 05 - Trenching and Backfilling.
   5. Section 33 10 00 - Water Utilities.
   6. Section 34 41 05 - Traffic Signs and Devices.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Payment at the Bid Unit Price will be considered compensation in full for all Work necessary to complete the Bid Item in full, including removal, salvage, storage, disposal, and reinstallation.
   2. Measurement will be based upon the units as listed below for items removed, abandoned, or salvaged complete as specified. No measurement will be made of any removals that are not required. The actual quantity removed multiplied by the appropriate Bid Unit Price will be compensation in full for all Work and costs of the following Bid Items:
      a. Sawing Concrete (Street, Driveway, Sidewalk): Per lineal foot along the saw cut line as staked, regardless of thickness.
      b. Sawing Asphalt (Street, Trail, Driveway): Per lineal foot along the saw cut line as staked, regardless of thickness.
      c. Remove Asphalt Pavement (Street, Trail, Driveway): Per square yard without regard to thickness.
      d. Remove Asphalt Wedge: Per square yard of asphalt wedge removed, regardless of thickness.
      e. Mill Asphalt Pavement: Per square yard, according to depth, including off-site disposal.
      f. Asphalt Joint Milling: Per linear foot of joint.
      g. Remove Concrete Pavement: Per square yard without regard to thickness.
      h. Remove Concrete Sidewalk: Per square yard without regard to thickness.
      i. Remove Concrete Pedestrian Ramp: Per square yard without regard to thickness.
      j. Remove Concrete Valley Gutter: Per square yard without regard to thickness.
      k. Remove Concrete Curb and Gutter: Per linear foot, regardless of type and includes saw cutting at removal limits.
      l. Remove Concrete Driveway Pavement: Per square yard without regard to thickness.
      m. Remove Concrete Spillway: Per square yard without regard to thickness.
      n. Remove Concrete Median: Per square yard, without regard to thickness.
      o. Remove Hydrant: Per each.
      p. Remove Valve and Box: Per each, regardless of size.
      q. Remove Curb Stop and Box: Per each, regardless of size.

r. Remove Catch Basin or Manhole: Per each, regardless of size of structure. Granular material is incidental to the removal.
s. Remove Pipe or Culvert: Per linear foot of the size and type specified, measured from center of junction fittings, catch basins, or manholes, and will include the length of any aprons.
t. Remove Trash Guard from Flared End Section: Per each, according to size and type.
u. Remove sign post or barricade: Per each.
v. Remove Marking Line: Per linear foot, regardless of type or size.
w. Remove Marking Special Marking: Per each, regardless of type or size. Special markings include arrows, bike lane symbols, and the word Only.
x. Remove Retaining Wall: Per square yard, measured to existing ground level.
y. Remove and Replace Concrete Curb and Gutter (High Early): A Bit Item has been provided in Section 32 16 13 – Concrete Curbs and Gutter.
z. Abandon Pipe: Per each end of pipe that is plugged, according to size and type of pipe.
aa. Abandon Structure: Per each, regardless of size of structure, and will include furnishing and installing granular material and removal of casting, adjusting rings and top section from Site.
bb. Salvage and Reinstall Fence: Per linear foot of the type specified.
cc. Salvage and Reinstall Pipe or Culvert: Per linear foot of the type and size specified.
dd. Salvage and Reinstall Flared End Section: Per each of the size specified.
ee. Salvage and Reinstall Sign: Per each, including post(s).
ff. Salvage and Reinstall Mailbox: Per each. Payment will include all costs to salvage and re-install the mailbox, including similar footing. Furnishing and installing a temporary mail box at a temporary location to allow continuous mail service will be considered incidental.
gg. Salvage and Reinstall Permanent Barricade: Per each, including sign panel.
hh. Salvage and Reinstall Hydrant: Per each.
ii. Salvage and Reinstall Valve and Box: Per each, according to size & type.
jj. Salvage and Reinstall Reducer: Per each, according to size.
kk. Salvage and Reinstall 6 Inch DIP: Per linear foot. Sawcutting and removing any extra pipe that is not needed at the new hydrant location will be considered incidental.

3. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" - latest edition including all current supplements (WisDOT):
   1. Section 204 – Removing of Abandoning Miscellaneous Structures.

1.04 DEFINITIONS

A. Remove: To take away or eliminate from the Site by any method selected by the Contractor, including disposal of material.

B. Salvage: To dismantle, disassemble, or remove carefully without damage so the item can be re-assembled, replaced, or reused in a workable condition equal to that existing before removal.

C. Abandon: To fill, bulkhead, or close off pipes and structures so that no settlement or flow can occur.

1.05 REGULATORY REQUIREMENTS

A. Conform to WisDOT Section 204, with the following modifications:
   1. Dispose of all materials designated for removal outside the Site at locations selected by Contractor.
   2. Stockpile or temporarily store materials designated for salvage at locations provided by Contractor.

1.06 SCHEDULING

A. Prior to starting Work, submit for review by the Engineer and approval by the Owner, a schedule showing the commencement, order, and completion dates of the various parts of this Work.

B. Install temporary erosion control, construction fence, barriers, and warning signs prior to removals.

C. Fill holes or depressions resulting from removal or salvage immediately.

D. Provide temporary surface restoration for traffic continuity where removal or salvage operations are completed within streets, driveways, or parking lots.

PART 2 PRODUCTS

2.01 Not Used.

PART 3 EXECUTION

3.01 GENERAL

A. Dispose of all items removed, except for those items identified to be salvaged or recycled. Said disposal shall be in accordance with all laws, regulations, statutes, etc.

B. Perform removal work without damage to adjacent retained work. Where such Work is damaged, patch, repair, or otherwise restore same to its original condition at no expense to the Owner.

C. Remove debris from the work area as often as necessary, but not less than at least once at the end of each workday. Debris shall be placed in approved containers to prevent the spread of dust and dirt.

D. Execute the Work in a careful and orderly manner with the least possible disturbance to the public and occupants of buildings.

E. Fill holes resulting from removals consistent with Section 31 23 00.

F. Remove and replace damaged curb as directed by the Engineer.

G. Remove 10 feet of concrete curb and gutter on each side of the catch basin that are adjusted, as directed by the Engineer.

3.02 EXAMINATION

A. Meet with owners of signs to determine requirements for salvage, storage, and replacement.

B. Develop plan acceptable to Engineer and postal service for maintaining mail service. Temporary relocations of mailboxes will be necessary.

3.03 PROTECTION

A. Take all necessary precautions to adequately protect personnel and public and private property in the areas of Work. All Site fencing shall be in place prior to the start of any removal work.

B. Remove, store safely, and replace all street signs, traffic control signs, guy wires, mailboxes, posts, wood fence, etc. that may interfere with construction.

C. Provide approved barriers or warning signs as necessary.

D. Provide and maintain temporary protection of existing structures designated to remain where removal work is being done, connections made, materials handled, or equipment moved.

E. Do not close or obstruct walkways or roadways. Do not store or place materials in passageways or other means of egress. Conduct operations with minimum traffic interference.

F. Take reasonable precautions to limit damage to existing turf.

G. Holes or depressions created by removals shall not be left open for more than 1 day. Any hole within 10 feet of sidewalks shall be filled, suitably marked, or covered immediately.

H. Avoid disturbance to any material beyond the limits required for new construction.

3.04 SAWING PAVEMENT

A. Concrete Pavement: Saw along the removal line to full depth of the existing concrete prior to removal of the pavement.

B. Asphalt Pavement: Saw along the removal line to the full depth of the pavement prior to removal of the pavement.

C. Provide means and method (such as snapping a chalk line) to establish a straight and uniform sawed line.

3.05 REMOVE CONCRETE PAVEMENT

A. Remove in accordance with WisDOT Section 204.3.2.2, except as modified below:
   1. Saw cut concrete pavement and concrete base prior to mechanical pavement removal equipment. Remove concrete in such a manner that the remaining pavement is not damaged.
   2. Prior to restoring trench areas, the edges of the trench shall be trimmed back to a vertical face on a straight line which is parallel with the centerline of the trench.

3.06 REMOVE ASPHALT PAVEMENT

A. Remove in accordance with WisDOT Section 204.3.2.2, except as modified below:
   1. Saw cut asphalt pavement at the removal limits prior to that removal, unless otherwise approved by the Engineer.

3.07 REMOVE CURB AND GUTTER

A. Saw cut at removal limits prior to removing curb and gutter.

B. Limits of removal may vary in length (5 feet minimum) and may be in multiple locations.

3.08 PAVEMENT MILLING

A. Asphalt:
   1. Saw cut at removal limits prior to milling process.
   2. Mill asphalt surface to the depth specified as shown on the Drawings or as directed by the Engineer. The milled surface shall be uniform and consistent, with minimal depth of grooves.
   3. Dispose of millings at an approved off-site disposal location.
   4. Sweeping with pickup broom or vacuum clean the milled surface shall be incidental to the milling process. Perform sweeping until milled surface is accepted by the Engineer.

B. Concrete:
   1. Mill surface to the depth specified as shown on the Drawings or as directed by the Engineer.
   2. Dispose of millings at an approved off-site disposal location.
   3. Sweeping with pickup broom and cleaning the milled surface shall be incidental to the milling process.

3.09 ASPHALT JOINT MILLING:

A. Mill to the depth and width as shown on the detail drawing, at the location marked by the Engineer in the field.

3.10 REMOVE CONCRETE SURFACING

A. Work includes sidewalks, pedestrian ramps, medians, valley gutters, and driveways.

B. Saw cut concrete surfacing prior to removal.

C. Remove concrete in such a manner that the remaining surfacing is not damaged.

D. When removing existing sidewalks, do not disturb any material beyond the limits required for new construction (assumed as 6 inches maximum beyond and 8 inches maximum below existing grade).

E. When removing existing driveways, do not disturb any material beyond the limits required to form for new construction (assumed 12 inches maximum from the back of new Work and 6 inches beyond the edge of new driveways).

F. Prior to restoring trench areas, the edges of the trench shall be trimmed back to a vertical face on a straight line which is parallel with the centerline of the trench.

3.11 REMOVE ASPHALT TRAILS AND DRIVEWAYS

A. Saw cut asphalt surfacing to full depth at the limits of partial removal prior to that removal, unless otherwise approved by the Engineer.

B. Remove asphalt in such a manner that the remaining surfacing is not damaged.

C. Prior to restoring trench areas, the edges of the trench shall be trimmed back to a vertical face on a straight line which is parallel with the centerline of the trench.

D. When removing existing trails and driveways, do not disturb any material beyond the limits required to form for new construction (assumed 12 inches maximum from the back of new work and 6 inches beyond the edge of new driveways).

3.12 REMOVE ASPHALT WEDGE

A. Remove asphalt wedge as shown on the Drawings or as directed by the Engineer.

B. Mill asphalt wedge in a manner that does not disturb the existing asphalt.

3.13 REMOVE/ABANDON MANHOLES AND CATCHBASINS

A. Remove Structure:
   1. Remove entire structure, including casting and adjusting rings.
   2. Fill void left by structure with suitable material per Section 33 05 05.

B. Abandon Structure per WisDOT Section 204.3.3, except as modified below:
   1. Remove casting, adjusting rings, and cone section or manhole section of structure, a minimum of 3 feet below final grade.
   2. Place and compact granular material within the remaining in place structure and the excavated area to finish grade.

3.14 REMOVE/ABANDON SECTIONS OF EXISTING PIPE

A. Remove Pipe:
   1. Remove entire pipe to limits shown on the Drawings or as directed by the Engineer.
   2. Fill void left by pipe with suitable material per Section 33 05 05.

B. Abandon Pipe per WisDOT Section 204.3.3, except as modified below:
   1. Bulkhead pipe with an 8-inch thick, non-shrink concrete grout plug at the upstream and downstream ends, and at locations as determined by the Engineer. On pipes 18-inches diameter and larger, brick or concrete block masonry may be used with non-shrink grout to construct the bulkhead.
   2. Remove pipe to be abandoned if the top of pipe is within 3 feet of final surface elevation.

3.15 REMOVE RETAINING WALL

A. Avoid damage to sections of wall to remain.

B. Dispose of materials off the Site at a predetermined location.

C. Remove wall in its entirety, including footings and tiebacks.

3.16 REMOVE SIGNS AND BARRICADES

A. Remove signs and barricades, including posts as shown on the Drawings or as directed by the Engineer.

B. Provide Engineer or Owner 48 hours notice prior to removing posts or barricades.

3.17 REMOVE PAVEMENT MARKINGS AND MESSAGES

A. Remove to the limits shown on the Drawings or as directed by the Engineer.

B. Removal of markings and messages shall be accomplished with suitable water blasting equipment, unless other means are authorized by the Engineer. Grinding is not an acceptable method of removal. The asphalt street surface shall not be damaged by the removal operations.

3.18 SALVAGE AND REINSTALL

A. Signs and Barricades:
   1. In no case shall a traffic sign or street sign be removed or disturbed by Contractor without prior notification being given to Engineer and then only after satisfactory arrangements have been made for a temporary installation or its disposition:
      a. Maintain temporary post mounted street identification signage at all times due to its importance to the 911 Emergency Response System.
      b. Maintain temporary post mounted traffic signage on all streets open to traffic.
      c. Temporary post mounted installation shall be considered incidental to the Project.
   2. Salvage sign panel or barricade and post(s) and temporarily store until reinstallation.
   3. Install temporary post mounted signs as described above.
   4. Reinstall salvaged sign panel or barricade and post(s).
   5. Remove signs and barricades that are damaged during construction and replace with new signs as incidental to the Project.
   6. Contact the County directly related to all signs within the County right-of-way that may need to be temporarily or permanently removed.

B. Mailboxes:
   1. Remove and salvage existing mailboxes that interfere with the Work or whose access is restricted by the construction activities.
   2. Place at temporary locations as directed by Engineer or as shown on Drawings.
   3. Removal, furnishing and installing a temporary mailbox, and replacement shall occur such that mail delivery is not interrupted.
   4. Reinstall in locations as shown on Drawings or as directed by Engineer.
   5. Replace mailboxes, posts, and appurtenances damaged during construction at no charge to Owner.

C. Fences:
   1. Salvage and store fence and post material where they are in conflict with the Work.
   2. After completion of Work, reinstall fence to the condition existing prior to removal.
   3. Install temporary snow fence or similar barrier at the end of the working day while the permanent fence is removed.

D. Culverts and Flared End Sections:
   1. Where possible, salvage existing pipe in areas to be disturbed by the construction.
   2. Reinstall in original condition and location as shown on the Drawings.
   3. If requested by the Owner, deliver salvaged material to Owner's Maintenance Facility.

E. Hydrants, Gate Valves, and Hydrant Lead:
   1. Salvage existing hydrants, gate valves, and ductile iron pipe leads at locations shown on the Drawings or as determined by the Engineer.
   2. Reinstall in original condition at the location shown on the Drawings or as directed by the Engineer.
   3. Reinstall per Section 33 10 00 and the standard details shown on the Drawings.

3.19 REMOVE AND REPLACE

A. Concrete Sidewalk and Concrete Curb and Gutter:
   1. It is anticipated that sections of concrete sidewalk and curb and gutter may be damaged from utility, building, other activity during the period between placement of the initial and final asphalt base courses, or identified by the Engineer as part of a street rehabilitation type project.
   2. Prior to placement of the asphalt wear course surfacing, remove and replace damaged sections of concrete sidewalk and curb and gutter as directed by the Engineer.
   3. Sawcut at removal limits.
   4. Do not disturb any material beyond the limits required to form for new construction (assumed 12 inches maximum from the back and 6 inches beyond the edge of new work).
   5. Install new sidewalk as per Section 32 13 14.
   6. Install new curb and gutter per Section 32 16 13.

3.20 FIELD QUALITY CONTROL

A. Salvaged items to be reinstalled shall be of the same shape, dimension, location, and quality of the original item prior to construction.

B. Items damaged during removal or salvaging operations shall be replaced with new material of equal type and quality of the damaged item when it was new.

3.21 DISPOSING OF MATERIAL

A. Dispose of all materials outside of the Site at disposal location selected by Contractor in compliance with state and local regulations. Burying of material and debris is not allowed within the Site.

END OF SECTION

SECTION 26 05 05

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. References used in Division 26 - Electrical.

B. Regulatory requirements for electrical construction.

C. Requirements of equipment and materials.

D. Workmanship.

1.02 RELATED SECTIONS

A. Conditions of the Contract, Supplemental Conditions, and Division 1 – General Requirements Sections apply to all work of Division 16 - Electrical.

B. Section 01 29 00 – Price and Payment Procedures.

C. Section 01 33 00 – Submittal Procedures.

1.03 REFERENCES

A. ANSI - American National Standards Institute:

1. C2 - National Electrical Safety Code.

2. C62.41-IEEE - Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

B. ICEA - Insulated Cable Engineers Association:

1. S-95-658 - Thermoplastic-Insulated Wire and Cable.

2. S-65-375 – Rubber-Insulated Wire and Cable.

C. NECA - National Electrical Contractors Association:

1. NECA 1 – Standard Practices for Good Workmanship in Electrical Contracting.

D. NEMA - National Electrical Manufacturers Association:

1. TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.

2. PB 2 - Deadfront Distribution Switchboards.

3. 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

4. WC 5 – (See ICEA S-95-658).

5. WC 7 – (See ICEA S-95-658).

E. OSHA - Occupational Safety and Health Administration:

1. 29 CFR 1910 – Occupational Safety and Health Standards.

F. UL - Underwriters Laboratories, Inc.:

1. UL 6 - Rigid Metal Conduit.

2. UL 83 - Thermoplastic - Insulated Wires and Cables.

3. UL 467 – Electrical Grounding and Bonding Equipment.

4. UL 486D – Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.

5. UL 651 - Schedule 40 and 80 Rigid PVC Conduit.

6. UL 891 - Dead-Front Switchboards.

7. UL 1029 - High-Intensity-Discharge Lamp Ballasts.

8. UL 1572 - High Intensity Discharge Lighting Fixtures.

1.04 REGULATORY REQUIREMENTS

A. All work performed under this Contract shall conform to the latest editions of the National Electrical Code (NFPA70), the National Electrical Safety Code (ANSI C2), and the Wisconsin State Building Code.

1.05 INSTRUCTIONS AND PARTS LITERATURE

A. Instruction and parts literature is generally packed with electrical equipment and devices. Contractor shall remove this literature from the packing container or equipment enclosure, identify the literature with the equipment to which it applies, and file the literature in loose-leaf binders with index tabs. Each binder shall have an index which lists each piece of equipment and the literature which applies to it. An index tab shall be provided for each piece of equipment.

1.06 SUBMITTALS

A. Shop drawings shall be submitted with Contractor's stamp of approval as specified in Section 01 33 00 – Submittal Procedures.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. All equipment and materials shall be provided as specified in Division 26 - Electrical Sections and Section 8 of the Conditions of the Contract.

B. All equipment and materials shall be new and shall bear the Underwriters Laboratories (UL) label if such products are listed by UL.

C. Where applicable, equipment and materials shall conform to ANSI, ICEA, IEEE, and NEMA standards.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. All work shall be performed in a neat and workmanlike manner consistent with the high quality standards of the electrical trade. "A neat and workmanlike manner" shall be as required by NFPA 70, Section 110-12; and shall conform to NECA 1, Standard Practices for Good Workmanship in Electrical Contracting. Each electrician shall be knowledgeable and well-trained in the particular tasks to be performed.

3.02 IDENTIFICATION

A. Nameplates shall be used to identify all field devices, such as disconnect switches, breakers, contactors, service entrance panels, etc.

B. All nameplates shall be engraved phenolic nameplates attached with stainless steel screws or a permanent stamped brass tag.

3.03 RECEIVING AND STORING EQUIPMENT

A. All equipment shall be handled and stored in accordance with the manufacturer's instructions.

B. In general, equipment packaging is not designed to protect the contents for outdoor storage. As a minimum, Contractor shall store the equipment prior to installation in a clean, dry location free from excessive temperatures, humidity, or foreign materials normally encountered at a Project Site. If the storage facility is unheated,

Contractor shall provide heating to protect control equipment from condensation, which could cause electronic components to corrode or to be otherwise damaged.

3.04 ALTERNATE

A. Refer to Section 0129 00 – Price and Payment Procedures for a description of work to be performed under the Alternate.

3.05 MEASUREMENT AND PAYMENT

A. Mobilization:

1. Measurement shall be Lump Sum for Mobilization. Payment at the Bid Unit Price shall be full compensation necessary to complete the work. The total sum shall not exceed the original Contract amount, regardless of the fact that the Contractor may have shut down work on the Project and/or moved equipment away for the Project and back again.

B. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

END OF SECTION

SECTION 26 05 19

WIRES AND CABLES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. 600 volt wire and cable.

B. Terminals and connectors.

C. Installation.

D. Splices and terminations.

E. Identification.

1.02 SUBMITTALS

A. Product data sheets shall be submitted for all wire and cable.

PART 2 - PRODUCTS

2.01 600 VOLT WIRE

A. Feeder and Branch Circuit Wire:

1. Stranded copper conductor, solid copper for lighting and convenience receptacle circuits only.

2. XHHW insulation.

B. Control Wire:

1. #14 AWG, 7 or 9 strand copper.

2. THWN or XHHW insulation.

3. Solid color.

C. Insulation of all wire shall conform to ICEA S-95-658, NFPA 70, and UL-83.

D. All Wire and Cable Shall Be:

1. New and coiled or on reels.

2. Each coil and/or reel shall have a label with the manufacturer's name, trade name of wire, size of wire, and UL label.

2.02 TERMINALS AND CONNECTORS

A. Tool compressed terminals and connectors shall be made of 1 piece seamless highly conductive copper with a uniform tin-plate coating to minimize corrosion; Burndy, 3M, or equal.

B. Step-down adapters shall be copper compression type; Greaves PT-R Series, or equal.

C. Electrical spring connectors shall be 3M “Scotchlok” or “Ranger,” Ideal “Wing-Nut,” or equal.

D. Fork Terminals:

1. Vinyl or nylon self-insulated locking type.

2. Terminal insulation that supports wire insulation.

3. Thomas & Betts Type FL, Burndy Type TP-LF, Panduit Type PNF, 3M Type MNG, or equal.

E. Waterproof kits shall be utilized for all outdoor below-grade splices and connections as follows:

1. Heavy wall, heat shrinkable with interior coating of hot melt adhesive – sealant. Tubing shall be chemically cross linked, thermally stabilized polyolefin.

2. UL listed (UL 486D).

3. 3M – ITCSN, or approved equal.

2.03 WIRE COLOR CODING

A. Contractor may use color coding at his discretion, except for the following colors which shall be used only as designated below for both power and control circuits:

1. Control Circuits:

a. Dark Blue - Direct current circuits.
b. Light Blue - Intrinsically safe conductors.
c. Green - Grounding conductor.
d. White - Neutral conductor.

2. Power Circuits (Use solid colors through Size No. 8 AWG. Use black conductors with tape color identification No. 6 AWG and larger):

	Voltage	120/240	208Y/120	480Y/277
a.	Phase A	Black	Black	Brown
b.	Phase B	Red	Red	Orange
c.	Phase C		Blue	Yellow
d.	Neutral	White	White	Gray
e.	Ground	Green	Green	Green

PART 3 - EXECUTION

3.01 INSTALLATION

A. All wire shall be installed in the specified raceways. Wire pulling shall be performed through the system in such a manner as to not exceed the maximum tensile strength of the cable being pulled as allowed by the NFPA 70 and/or cable manufacturer. All handling and installation of wire and cables shall be done by competent and skilled workmen who shall use methods which will prevent damage to the wire and cable. Pulling compound shall dry to a fine lubricating non-conductive powder and shall be approved by the cable manufacturer.

B. Adequate measures shall be employed to determine that the raceways are free of foreign material and moisture before pulling wire or cable.

C. Any conductor used for equipment grounding purposes shall be green in color, unless it is bare. Conductors with white or green covering shall not be used to indicate other than neutral or grounding. This limitation applies to all power and control circuits.

D. Conductors shall be without splice from termination to termination, unless indicated otherwise on the Drawings.

3.02 SPLICES AND TERMINATIONS

A. All splices, taps, and terminations shall be made with tool compressed connectors. Contractor shall provide all wire connectors, lugs, and terminals, unless indicated otherwise.

B. Bolted compression lugs furnished as an integral part of the equipment shall be used to terminate the conductors to that equipment.

C. Motor leads shall be connected with tool-compressed ring terminals which are bolted together, insulated with varnished cambric tape, and protected with an over-wrap of 3M No. 33, or approved equal weather resistant tape, or protected with

Raychem MCK motor connection kit. Electrical spring connectors may be used to connect motor leads to #12 or #10 AWG branch circuit conductors.

D. Electrical spring connectors shall be used for splices and taps in lighting and 120 volt receptacle circuits.

E. Every bolt, lug, and screw termination shall be tightened with a torque wrench or torque screwdriver to the torque values specified in UL Standards and/or as specified by the device manufacturer.

3.03 MEASUREMENT AND PAYMENT

A. Wire:

1. Measurement shall be by the linear feet between end terminals along the centerline of each type and size of wire installed. Payment at the Bid Unit Price shall be full compensation for furnishing and installation of all materials, including:

   a. The wire as specified, splicing materials, terminals, and equipment required for making connections.

   b. Installation of the underground wire as specified, including splicing, pulling, making required connections, and testing.

   c. All other miscellaneous items required for a complete installation of the underground wire

B. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

END OF SECTION

SECTION 26 05 26

GROUNDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. A grounding electrode system shall be provided for the service entrance.

B. System and equipment grounding shall be provided as shown on the Drawings and as specified herein.

1.02 RELATED SECTIONS

A. Section 26 27 00 - Service Entrance.

B. Section 26 08 00 - Testing and Commissioning.

1.03 REFERENCES

A. NFPA 70 - National Electrical Code.

B. UL 467 - Electrical Grounding and Bonding Equipment.

PART 2 - PRODUCTS

2.01 WIRE

A. Class B stranded copper; either bare or with green insulation.

B. Size shall be as specified herein and/or as shown on the Drawings.

2.02 GROUND RODS

A. 5/8 inch x 10 feet copperweld.

2.03 CONNECTORS AND TERMINATORS

A. Tool-compressed connectors and lugs which are UL listed (UL 467); Burndy "Hyground," Thomas & Betts 53,000 Series, or approved equal.

B. Bar taps for connection to bus bars which are UL listed (UL 467); Burndy Type QGFL, or approved equal.

C. Exothermic welding components; Continental Industries "Thermoweld," Erico Products "Cadweld," or approved equal.

D. Ground clamps shall be cast brass or bonze, UL listed (UL E10661); American Electric GC, Thomas & Betts CTG102, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The Power Company will provide grounding electrodes at the transformer and make the connections from the grounding electrode to the transformer neutral.

B. The Power Company's transformer neutral shall be connected to the service entrance panel ground bus with the grounding conductors provided with the service entrance phase conductors.

C. Contractor shall provide 1 grounding electrode (ground rod) at the service entrance panel as shown on the Drawings. The grounding electrode system shall be connected to the neutral bus and the ground bus of the service entrance panel in accordance with NFPA 70, Articles 250.24 and 250.32.

D. An equipment grounding conductor shall be installed with each feeder circuit and the lighting branch circuits. Conductor shall be connected to the equipment ground bus or to the enclosure if there is no ground bus.

3.02 SPECIAL REQUIREMENTS

A. Contractor shall determine if there are any other special grounding requirements for equipment furnished on this Project and shall provide grounding as specified by the manufacturer.

3.03 SPLICES AND TERMINATIONS

A. In general, splices and terminations of the grounding electrode system shall be brazed, shall be exothermic welded, or shall be made with tool-compressed fittings.

B. Connections to bus bars or equipment enclosures shall be made with tool-compressed lugs which are bolted to the equipment or with bar taps.

C. Connections to ground rods shall be exothermic welded. Provide adapter sleeves as required for #6 AWG conductors or smaller.

3.04 TESTING

A. The ground resistance of each grounding electrode shall be measured before it is connected to the grounding electrode system. A ground resistance measurement shall be made of the grounding electrode system for the service entrance panel. A ground measurement shall be made of the complete grounding system after all grounding conductor terminations have been made.

B. Ground resistance measurements shall be made as specified in Section 16950 – Testing and Commissioning.

3.05 MEASUREMENT AND PAYMENT

A. Ground Rods:

1. Ground rods and wiring to ground rods shall be considered as incidental to lighting unit, service panels, and etc.

B. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

END OF SECTION

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SECTION 06 05 33

RACEWAYS AND FITTINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Conduit.

B. Conduit fittings.

C. Underground warning tape.

1.02 SUBMITTALS

A. Product data sheets for each type of conduit shall be submitted.

PART 2 - PRODUCTS

2.01 RIGID METAL CONDUIT

A. Steel:

1. Galvanized inside and outside.

2. NFPA 70, Article 344.

3. UL Listed.

2.02 RIGID METAL CONDUIT FITTINGS

A. Threaded couplings and fittings only; no set screw, gland type, or split fittings.

B. Grounding type insulated bushings; O-Z/Gedney Type BLG, or equal.

C. Insulated bushings; Midwest Electrical Mfg. Co., O-Z/Gedney Type B, or equal.

D. Sealing locknuts; Midwest Electrical Mfg. Co., RACO, or equal.

E. Expansion Fittings:

1. 4 inch conduit movement.

2. External bonding jumper.

F. Pull Fittings (C, LB, etc.): Clamp type, stamped covers with gaskets and stainless steel screws and clamps.

G. Conduit Hubs:

1. Full contact type with sealing “O” ring.

2. Myers “Scru-tite,” or equal.

H. Material: Fittings, hubs, etc. shall be galvanized steel for galvanized steel conduit and copper free aluminum for aluminum conduit.

I. Corrosion Resistant Coatings: All rigid metal conduit installed underground or in contact with concrete shall be painted with 1 coat of Carboline Carbocrylilc 120 (for both steel and aluminum conduit), or equal, as a pre-treatment followed by 2 coats of Carboline Bitumastic 300M, or coated with 3M Scotchrap Pipe Primer, and wrapped with 3M Scotchrap Corrosion Protection Tape.

2.03 RIGID NONMETALLIC CONDUIT AND FITTINGS

A. EPC-40-PVC and EPC-80-PVC for Type II and Type III applications.

B. Sunlight resistant.

C. NEMA TC2.

D. NFPA 70, Article 352.

E. UL Listed.

F. Carlon, CertainTeed, or approved equal.

2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Galvanized steel core.

B. Built-in continuous copper ground in 1/2 inch through 1-1/4 inch.

C. PVC jacket.

D. NFPA 70, Article 350.

E. UL listed.

F. Amer-Tite Type UL, Anamet Anaconda Sealtite Type U.A., Electri-Flex Liquatite Type L.A., or equal.

G. Connectors:

1. Grounding ferrule and insulated throat.

2. Appleton STB, Crouse-Hinds LTB, Midwest Electric LTB, or equal.

2.05 UNDERGROUND WARNING TAPE

A. 6 inches wide, 4 mil polyethylene film.

B. Vivid, opaque, long-lasting red color with bold, black letters.

C. Lettering:

1. Top line – "...CAUTION CAUTION CAUTION..."

2. Bottom line – "...ELECTRIC LINE BURIED BELOW..."

D. Seton Name Plate Corp. No. 210 ELE, EMED Co. Stock No. UT27737-6, or equal.

2.06 CONDUIT CLAMPS

A. Conduit clamps for rigid metal conduit shall be malleable iron, 1 hole clamps with malleable iron clamp backs; Crouse-Hinds MW500 Series, Raco 1303/1324, Appleton CL75M/600M, or equal.

PART 3 - EXECUTION

3.01 CONDUIT INSTALLATION

A. Conduit size shall be as shown on the Drawings or as required by the NFPA 70 with a minimum size of 3/4 inch, except that 1/2 inch may be used to connect to devices which have a knock-out or fitting for only 1/2 inch conduit. All raceways shall be installed in accordance with NECA 1, Standard Practices for Good Workmanship in Electrical Contracting, and as specified herein.

B. Expansion fittings shall be installed where the length of straight run requires it.

C. All conduits shall be kept dry and free of water or debris with pipe plugs or caps.

D. Conduit terminations to terminal boxes, cabinets, and enclosures shall have double locknuts and insulated bushings. External locknuts shall be sealing locknuts.

E. All conduits which enter major equipment, such as the service entrance switchboard and motor control centers, shall have grounding type insulating bushings.

F. Conduit terminations to outdoor or below ground NEMA 3R, 4, and 4X terminal boxes, pull boxes, cabinets, and enclosures shall use full contact hubs.

G. Liquidtight flexible metal conduit shall be used to connect from the rigid conduit system to equipment and devices if a rigid connection is improper or impractical.

H. Underground conduit runs shall have a minimum cover of 2 feet and shall be rigid nonmetallic conduit, unless noted otherwise:

1. Conduit shall be sloped to drain to handholes or pull boxes.

2. Rigid metal conduit shall be used for the vertical elbow and riser out of the ground.

3. Rigid metal conduit installed underground or in contact with concrete shall have a corrosion resistant coating or covering.

I. Contractor shall do all trenching for underground conduit with a minimum size trench. 3 inches of sand shall be placed below and above buried conduit in trench. All fill material shall be placed in 12 inch lifts and compacted to 90 Percent Standard Proctor Density. Underground warning tape shall be laid in the trench approximately 9 inches below the surface.

J. A nylon pull cord shall be installed in each empty conduit.

K. Only raceway types which are specified herein shall be used.

L. The roadway, sidewalk, or grade beneath which conduit is routed shall be restored to its original or better condition.

3.02 MEASUREMENT AND PAYMENT

A. Conduit

1. Measurement shall be by the linear feet between end terminals along the centerline of each type and diameter of conduit installed. Payment at the Bid Unit Price shall be full compensation for furnishing and installation of the conduit, including:

a. Conduit as specified, conduit sleeves, couplings, weatherheads, elbows, bushings, internal wiring, underground warning tape, terminals and connectors, fastening hardware, sealing around the conduit where it enters a pull box, and sealing conduit ends in concrete foundations and in pull boxes.
b. Installation of the conduit as specified.
c. Grounding and bonding of the conduit.
d. Trenching, jacking, and augering.

e. Backfilling and restoring sod, sidewalks, pavement, and any other surface restoration.
f. Traffic control.
g. Rental equipment.
h. All other miscellaneous items required for a complete installation of the light bases.

B. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

END OF SECTION

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SECTION 26 08 00

TESTING AND COMMISSIONING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. All equipment checks, adjustments, tests, and system energization shall be performed as specified below. If any test specified will void the warranty of any equipment to be tested, the Engineer shall be notified and further instructions received before proceeding with the test.

B. The following items shall be tested:

1. Grounding system resistance.

2. Receptacle outlets.

C. When the work is complete, a final inspection will be made and the Contractor shall demonstrate that all equipment and systems conform to the Drawings and Specifications.

1.02 RELATED SECTIONS

A. Bidding Requirements, Contracting Requirements, and Division 1 – General Requirements Specification Sections apply to all work of Division 26 - Electrical.

1.03 QUALIFICATION OF PERSONNEL

A. All personnel responsible for testing and commissioning equipment as a part of this Project shall be specially trained for the tasks they are to perform.

B. Personnel operating test equipment shall have had previous training and experience in using the equipment and shall be thoroughly familiar with the equipment capabilities and limitations.

C. All tests shall be made by or under the direct supervision of service personnel who are factory-trained in the application and operation of the device being tested.

D. Evidence of the experience of test personnel in the form of certificates of training or other acceptable documentation shall be made available upon request of the Engineer.

E. The Engineer reserves the right to require the Contractor to provide different test personnel if those performing the tests do not demonstrate competency in their work.

1.04 SCHEDULING AND REPORTING

A. All tests shall be scheduled 48 hours in advance with the Engineer and shall be conducted in his presence or the presence of his representative. Test results shall be tabulated neatly and legibly on the test forms, which are included at the end of this Section and which are available from the Engineer. Any other report forms shall be submitted for approval at least 4 weeks before tests are made. Test reports shall include the pertinent readings or observations, a description of the method used, and a list of the equipment employed.

B. If the materials or equipment fail under test, the test reports shall include the following:

1. Pertinent readings or observations made up to the point of failure.

2. Any abnormal readings.

3. Any data which might indicate the cause of failure.

4. The cause of the failure, if determined.

5. Corrective measures taken.

C. In all cases of test failure, the Contractor shall demonstrate that the corrective measures proposed are adequate before making any repairs, adjustments, or replacements.

D. 6 copies of all test reports shall be submitted to the Engineer within 24 hours after completion of the test. In addition, 1 complete set of test reports shall be included in each Operation and Maintenance Manual.

1.05 TESTING EQUIPMENT

A. Testing equipment used for a given test shall be recommended by the manufacturer for that particular test and shall be approved by the Engineer.

B. Ground resistance measurements shall be made with a 3 terminal, null balance instrument that has an accuracy of +/- 2 percent of full scale reading of selected range, and which provides direct reading down to 0.5 ohm; AEMC Model 3640, AVO (Megger) Catalog No. DET62D, or approved equal. Approved Alternates are the AEMC Model 3711 and the AMPROBE Catalog No. AMPDGC1000 clamp-on ground testers.

C. Voltage and current measurements shall be made with a true RMS instrument, which has an accuracy of ± 1 percent of full scale. Scale shall be selected so that the reading is not less than one-half scale.

D. All test equipment shall be provided by the Contractor.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 INSPECTION

A. All equipment shall be given a thorough visual inspection by the installer to detect insofar as possible any loose or erroneous connections, damaged components, the presence of foreign objects or materials, poor workmanship, incorrect rating of protective devices, or other abnormal conditions.

B. Every bolted or screwed connection or terminal with a torque rating shall have a torque wrench or torque screwdriver applied to assure tightness before any equipment is energized. This shall apply to both factory made and field made connections and terminations. Any problem or damage resulting from a faulty connection or termination shall be the responsibility of the Contractor.

C. Covers shall be installed on all pull boxes, junction boxes, and raceway fittings before the final inspection.

3.02 GROUND RESISTANCE MEASUREMENTS

A. The resistance of each ground rod shall be measured with a 3 terminal connection. Another measurement shall be made after all ground connections are made.

3.03 RECEPTACLE TESTS

A. After the system is energized, each receptacle shall be checked with a receptacle tester to verify proper connection of the hot, neutral, and grounding conductors.

3.04 MEASUREMENT AND PAYMENT

A. Testing:

1. Testing shall be considered as incidental to lighting units, service entrance panels, and etc.

B. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

GROUND RESISTANCE TEST REPORT

GENERAL	Project:	File Number:	Date:
	Contractor:	Inspector:	Tested By:
	Equipment Name:	Location:	
	Manufactured By:	Serial Number:	
	Auxiliary Device:	Manufacture Check:	
EQUIPMENT	Test Method _____ 3-Terminal Connection	 _____ Other (Specify)	
	Potential Electrode Type: Distance:	Current Electrode Type: Distance:	
	Measured Resistance Ohms:		
TEST SET	Manufacturer:	Type:	
REMARKS	Acceptance Criteria (Spec. Standard)		

END OF SECTION

SECTION 26 07 00

SERVICE ENTRANCE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Service Entrance Panel.

B. Meter Socket.

C. Installation.

D. Testing and Commissioning.

1.02 RELATED SECTIONS

A. Conditions of the Contract, Supplemental Conditions, and Division 1 – General Requirements Sections apply to all work of Division 26 - Electrical.

1.03 REFERENCES

A. ANSI C62.41 - IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

B. NEMA PB 2 - Deadfront Distribution Switchboards.

C. NFPA 70 - National Electrical Code.

D. UL 891 - Dead-Front Switchboards.

1.04 SUBMITTALS

A. Drawings submitted for approval of the service entrance panel shall include the following information:

1. Detailed top, front, and end views.

2. Outline dimensions, including weights.

3. Electrical line diagrams and schematics.

4. Metering and other wiring diagrams.

5. Component device and material lists.

6. Time-current curves for the circuit breakers and fuses.

7. Nameplate entries and schedules.

8. Features and accessories furnished to meet Specification requirements.

9. Cable access and exit areas, termination spaces, pull boxes.

PART 2 - PRODUCTS

2.01 EQUIPMENT RATINGS (Applicable to all products specified herein, unless noted otherwise)

A. Voltage: 120/240 volt, 1 phase, 3 wire, 60 Hz.

B. Amperage: 100 amp.

C. Fault Current Available: 22,000 amp, RMS symmetrical fault at rated voltage.

2.02 SERVICE ENTRANCE PANEL

A. Enclosure:

1. NEMA 4X enclosure.

2. Hinged door with hasp and meter seal provisions.

3. Provide provisions for mounting to a wood pole.

4. Dimensions which comply with NFPA 70.

5. Neutral bar for service entrance cables, grounding electrode conductor, and load cables.

6. American Midwest Power, Inc., Electro-Mechanical Industries, Inc., States Electric Mfg. Co., or approved equal.

B. Circuit Breakers:

1. Thermal magnetic, molded case circuit breakers.

2. Service entrance rated as required.

3. Operating mechanisms shall be with provisions for padlocking in the open position.

4. Open type for mounting in an enclosure.

5. Circuit breaker shall be Cutler-Hammer, General Electric, Siemens, Square D, or approved equal.

C. Laminated Plastic Nameplates:

1. Nameplates shall have 1/2 inch white lettering on a black background.

2. Nameplates shall be provided to identify all devices that extend thru the door or are visible with the door closed.

D. Photo Electric Cell:

1. Light level selector to adjust activation.

2. Time-delay activation and de-activation.

3. SPST contacts rated 15 amps tungsten or 8.3 amps ballast at 120 Vac.

4. 1/2 inch male thread for mounting.

5. Intermatic K4100, Tork 2100, or approved equal.

E. Lighting Contactor:

1. 600 volt electrically held.

2. Ampere rating and number of poles per the Drawings.

3. NEMA 1 enclosure or open type if mounted in enclosure with other components.

4. Cutler-Hammer CN35, General Electric CR360L, Square D Class 8903 Type S, or approved equal.

F. Single Pull Double Throw Switch:

1. Gounding.

2. Double-throw Ctr-OFF momentary contact.

3. 15 amp.

4. 1/2 HP – 120 V 2 HP – 240 V – 277 V.

5. Termination on back and side.

6. Gray in color.

7. UL certification.

8. Industrial grade.

9. Type FS or FD copper-free aluminum cast device boxes for all surface mounted small boxes.

10. Surface mounted switches and receptacles in FS or FD cast device boxes shall have a stamped aluminum cover, Appleton, or approved equal, or a gasketed, cast plate, Crouse-Hinds Feraloy, or approved equal.

11. Leviton 1256 Series, or equal.

G. Receptacle:

1. Specification grade, 3 wire grounding type.

2. Side wired.

3. Rated 20 amperes, 125 volts.

4. Gray color.

5. Eagle 5362, General Electric GE 4108, Hubbel 5362, Leviton 5362, Pass & Seymour 5342-I, or approved equal.

6. Type FS or FD copper-free aluminum cast device boxes for all surface mounted small boxes.

7. Surface mounted switches and receptacles in FS or FD cast device boxes shall have a stamped aluminum cover, Appleton, or approved equal, or a gasketed, cast plate, Crouse-Hinds Feraloy, or approved equal.

2.03 METER SOCKET

A. Power company approved meter socket.

2.04 WEATHERHEAD

A. Utility approved weatherhead.

2.05 WOOD POLE

A. Utility approved wood pole.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install service entrance equipment as shown on the Drawings.

B. The neutral leads from the service transformer shall be connected to the service entrance panel ground bus.

C. Coordination of Work with the Utility:

1. Contractor responsible for all coordination with the utility with regard to the service connection.

2. Provide and install riser up wood pole, whether-head, wiring, grounding, meters socket, panels,

3. Install items furnished but not installed by the utility, i.e. meter.

3.02 TESTING AND COMMISSIONING

A. All equipment shall be tested in the presence of the Engineer and all operations proved satisfactory.

3.03 MEASUREMENT AND PAYMENT

A. Service Entrance Panel:

1. Measurement shall be by each type of Service Entrance Panel installed. Payment at the Bid Unit Price shall be full compensation for furnishing and installation of the service cabinets, including:

a. Service Entrance Panel as specified, circuit breakers, laminated plastic nameplates, photo electric cell, lighting contactor, switch, receptacle, service entrance riser, grounding equipment, and mounting hardware.
b. Installation of the service cabinet as specified.
c. All other miscellaneous items required for a complete installation of the service cabinet(s).

B. Meter Socket:

1. Meter socket shall be considered as incidental to the Service Entrance Panel.

C. Whether-Head:

1. Whether-head shall be considered as incidental to the Service Entrance Panel.

D. Wood Pole:

1. The wood pole shall be considered as incidental to the Service Entrance Panel.

E. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

END OF SECTION

SECTION 26 56 19

LIGHTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. A Complete Lighting System Consisting of the Following:

1. Luminaires, including lamps.

2. Luminaire ballasts as required.

1.02 RELATED SECTIONS

A. Section 33 05 05 – Trenching and Backfill.

1.02 REFERENCES

A. FCC - Federal Communications Commission.

B. NFPA 70 - National Electrical Code.

C. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

D. OSHA - Occupational Safety and Health Administration.

E. UL 1029 - Ballasts, High-Intensity Discharge Lamp.

F. UL 1572 - Lighting Fixtures, High-Intensity - Discharge.

1.03 SUBMITTALS

A. Product cut sheets with specified features highlighted for each luminaire.

B. Product photometric data for each luminaire which is not listed in the Specifications or which does not have prior approval.

PART 2 - PRODUCTS

2.01 LUMINAIRES

A. Traditional acorn shaped luminaire with the following features:

1. One (1) 100W metal halide lamp.

2. Multi-tap (120, 208, 240, 277 volt) high power factor ballast.

3. Plug-in electrical modules.

4. Molded thermal resistant borosilicate glass refractor and top reflector mounted within decorative aluminum ribs and banding. A top glass reflector shall redirect 50 percent of the upward light to the controlling refractor while allowing a soft uplight component to define the traditional acorn shape of the fixture. Provide a stainless steel hinge and latch for re-lamping. The lower refractor uses precisely molded prisms to maximize pole spacing while maintaining uniform illuminance. IES Type III distribution shall be provided.

5. The housing and door shall be cast aluminum.

6. Finish shall be a polyester powder paint applied after a seven stage pretreatment process. Finishes shall be green in color.

7. UL listed.

8. Trim shall be ribs and band with a hinged top.

9. Standard finial.

10. Finial and trim shall be gold.

11. Pole:

    a. The lighting post shall be all aluminum, 1 piece construction, with a hexagonal fluted and tapered base design.
    b. The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B179-95a or ASTM B26-95. The straight shaft shall be extruded from aluminum, ASTM 6061 alloy, heat treated to a T6 temper. The tapered shaft shall be extruded from aluminum, ASTM 6063 alloy, spun to a tapered shape, then heat treated to a T6 temper. All hardware shall be tamper resistant stainless steel. Anchor bolts to be completely hot dip galvanized.
    c. The post shall be a direct burial type base.
    d. 4 inch diameter fluted shaft 12 feet tall.
    e. The color shall be dark green.
    f. All pole installations shall be capable of withstanding the forces produced by 90 mph winds with a 1.3 gust factor and the total number of luminaires required per pole.

12. Holophane PT12F/18FB-CA-GVU100DMHMTN3RSG, or approved equal.

B. City Standard – Specification grade luminaire for parking areas, office parks and walkways with the following features:

1. One (1) 250W high pressure sodium lamp.

2. Multivolt (120, 208, 240, 277 volt) high power factor ballast.

3. Flat Lens

4. Arm Mount.

5. Horizontal Type III Distribution.

6. Specular, anodized aluminum reflectors.

7. The housing and door shall be cast aluminum.

8. Finish shall be a polyester powder paint finish. Finishes shall be dark bronze in color.

9. UL listed.

10. Pole:

a. The lighting post shall be single piece, multi-sided 201L stainless steel with 6' mast.
b. Standard anchor base, 304L stainless steel.
c. Sixteen sided shaft 35 feet tall.
d. Millerbernd 16-SDA-6-350
e. Breakaway bases shall be Transpo Industries Pole-Safe Model 4100.
f. All pole installations shall be capable of withstanding the forces produced by 90 mph winds with a 1.3 gust factor and the total number of luminaires required per pole.

11. Hubbell (Spaulding Lighting) CM-A-S25-H3-F-Q-DB-L, including adaptor sleeves.

C. Alternate to City Standard – Specification grade luminaire for parking areas, office parks and walkways with the following features:

1. Prior approval from Public Works Staff required.

2. One (1) 250W high pressure sodium lamp.

3. Multivolt (120, 208, 240, 277 volt) high power factor ballast.

4. Flat Lens

5. Arm Mount

   a. Aluminum arm
   b. 6’ distance from center of pole to end of arm.
   c. 2’-6” arm rise, 2’-0” rise from top of pole.
   d. Mounted to pole with an extruded aluminum split clamp.
   e. Flagpoles, Inc FPEA.

6. Horizontal Type III Distribution.

7. The housing and door shall be cast aluminum.

8. Finish shall be a polyester powder paint finish. Finishes shall be dark bronze in color.

9. UL listed.

10. Pole:

    a. The lighting post shall be tapered alluminum tube “D” Wall Alloy 6063-T6.
    b. Standard anchor base, Alloy 356-T6.
    c. Circular shaft 30 feet tall.
    d. FlagPoles, FPEA352375-6C-30-4.5-WISDOT
    e. Speeds greater then 40mph
       i. Breakaway bases shall be Transpo Industries Pole-Safe Model 4100.
    f. Speeds less then 40mph
       i. Breakaway bases shall be Transpo Industries Pole-Safe Model 4100.
       ii. Breakaway bases shall be Akron Foundry Co. TB2-17”.
    g. All pole installations shall be capable of withstanding the forces produced by 90 mph winds with a 1.3 gust factor and the total number of luminaires required per pole.

9. GE MDCL-25-s-0-H-1-F-MC3-1-U

2.02 BALLASTS

A. High Pressure Sodium and Metal Halide Ballasts:

1. High power factor (90 percent or higher).

2. Minimum starting temperature of –20° F.

3. Crest factor not greater than 1.7.

2.03 LAMPS

A. High Pressure Sodium:

1. Medium or mogul base reflector or non-reflector as required by luminaire.

2. Wattage as specified in the luminaire description.

3. Color temperature 2000 K.

4. Shall have a minimum Color Rendering Index (CRI) of 21 (or greater).

5. Philips, or pre-approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. In general, luminaires shall be located where shown on the Drawings.

B. Lenses, refractors, and glassware shall be clean and free from cracks or chips. All reflectors, shades, luminaire bodies, etc. shall be free from dents and scratches, thoroughly cleaned, and properly aligned before installation is accepted by the Owner. All exposed tags and labels other than UL shall be removed.

C. Pole erection and mounting shall be done according to pole manufacturer's recommendations.

3.03 IDENTIFICATION

A. Each pole shall be identified on the inside of the handhole cover with the number shown on the Drawings.

3.02 MEASUREMENT AND PAYMENT

A. Lighting Units:

1. Measurement shall be by each luminaire and pole installed. Payment at the Bid Unit Price shall be full compensation for furnishing and installation of the Lighting Units, including:

a. Installation of the Lighting Units as specified, including the luminaire, lamps of the specified wattage, ballast, pole and bracket, conductors between pole base and fixtures, and the numbering of the light standards.
b. Installation of the Lighting Units and poles as specified.
c. Bonding and grounding materials and connections.
d. All other miscellaneous items required for a complete installation of the Lighting Units, including but not limited to removing rocks and replacing them when the installation is complete.

B. All other work and costs of this Section shall be incidental to the Project and included in the TOTAL BASE BID.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Removal and trimming of vegetation and trees, and stripping and stockpiling of sod and topsoil.

B. Related Sections:
   1. Section 31 23 00 – Excavation and Fill

1.02 PRICE AND PAYMENT PROCEDURES

A. Measure and Payment:
   1. Payment at the Unit Price will be considered compensation in full for all work necessary to complete the Bid Item in full.
   2. Clearing and Grubbing:
      a. Measurement will be by physical count of each tree cleared and grubbed having a diameter of more than 4 inches at a point 24 inches above the ground surface. Payment will constitute compensation in full for all removal, disposal work, and costs.
      b. Measurement will be by lump sum for all Project Clearing and Grubbing. Payment will constitute compensation in full for all removal, disposal work, and costs.
      c. Measurement will be by acre of trees cleared and grubbed. Measurements shall be made horizontally to points 10 feet outside the trunks of trees or stumps on the perimeter of the area being measured. Any separate area smaller than 1/20 acre will be considered to be 1/20 acre:
         1) Whenever isolated trees or stumps are removed outside the areas designated to be cleared and grubbed, the acre payment will be made by:
            a) Each tree measuring more than 4 inches, but less than 36 inches in diameter, at a point 2 feet above the ground surface, and each stump measuring more than 4 inches, but less than 36 inches, at the point of cutoff will be considered as being 1/20 acre.
            b) Each tree or stump measuring 36 inches or more in diameter will be considered as being 1/10 acre.
      d. Payment will constitute compensation in full for all removal, disposal, and costs.
   3. Clearing:
      a. Measurement will be by physical count of each tree cleared having a diameter of more than 4 inches at a point 24 inches above the ground surface. Payment will constitute compensation in full for all removal, disposal, and costs.
      b. Measurement will be by acre of trees cleared. Measurements shall be made horizontally to points 10 feet outside the trunks of trees or stumps on the perimeter of the area being measured. Any separate area smaller than 1/20 acre will be considered to be 1/20 acre.
   4. Grubbing:
      a. Measurement will be by physical count of each tree or stump grubbed. Payment will constitute compensation in full for all removal, disposal, and costs.
      b. Measurement will be by acre of trees or stumps grubbed. Measurements shall be made horizontally to points 10 feet outside the trunks of trees or stumps on the perimeter of the

area being measured. Any separate area smaller than 1/20 acre will be considered to be 1/20 acre.

5. Sod Removal: This Work is considered incidental to the other Work of the Contract.
6. Windfall/Deadfall Removal: This Work shall be incidental to the Project with no direct compensation.
7. Brush Removal: This Work shall be incidental to the Project.
8. Stripping and Stockpiling of Soil: This Work shall be considered incidental to other Work in the Contract.
9. Any tree trimming necessary to perform other work in the Contract shall be considered incidental.
10. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WisDOT Spec.):
   1. 201 – Clearing and Grubbing.
   2. 202 – Roadside Clearing

1.04 DEFINITIONS

A. Brush: All bushes, shrubs, and other vegetation that can be cut with a brush scythe or mowing machine, including small isolated trees having a diameter of 4 inches or less at a point 2 feet above the ground surface.

B. Clearing: Cutting, removing, and disposing of trees, shrubs, bushes, windfalls, and other vegetation in the designated areas.

C. Grubbing: Removing and disposing of stumps, roots, and other remains in the designated areas.

D. Tree Trimming/Pruning: Cutting broken, damaged, or obstructing branches and installing wound dressing. Includes the uplift of branches along the roadway to allow for street construction.

1.05 SITE CONDITIONS

A. Work consists of removing trees generally along the easement lot lines designated for utilities.

B. The Drawings do not specifically show all trees to be removed or transplanted.

C. Protect specimen trees close to Work that are designated to remain but may be damaged by Work.

1.06 SEQUENCING AND SCHEDULING

A. Install temporary erosion control measures prior to Work of this Section.

B. Complete before or sufficiently ahead of on-going rough grading, excavation, backfill, and compacting for utilities.

PART 2 PRODUCTS

2.01 WOUND DRESSING

A. Asphalt base tree paint.

B. Other acceptable materials per Engineer's approval.

PART 3 EXECUTION

3.01 GENERAL

A. Review removals in the field with the Engineer prior to doing Work. Clearing limits will be clearly marked by the Engineer.

B. Assume multiple mobilizations for the Work of this Section.

C. Stockpile soil to eliminate contamination with other on Site materials.

3.02 CLEARING AND GRUBBING

A. Clearing Trees: Cut off, remove, and dispose of trees and brush in the areas designated as a clearing operation. When grubbing is not required, the point of cut off shall be 6 inches above the ground.

B. Clearing Brush: Cut even with the ground surface.

C. Grubbing: Remove brush, stumps, roots, and other remains to a minimum depth of 6 inches below subgrade for all proposed sections.

D. Backfill all depressions resulting from the grubbing operations in accordance with Section 31 23 00.

3.03 TRIMMING AND PRUNING

A. As directed by the Engineer, trim trees that are to be saved but interfere with the proposed construction. Paint all cuts with wound dressing.

3.04 STRIPPING

A. After clearing and grubbing have been completed, strip sod and topsoil to a line 2 feet outside of areas to be occupied by structures, walks, roadways, areas to be excavated or filled, and other areas shown.

B. As directed by Engineer, Stockpile sufficient topsoil to re-spread at a uniform depth of 4 inches to all disturbed areas identified for seeding or sodding:
   1. Do not strip within the drip line (branch spread) of trees identified to remain.

3.05 DISPOSAL LIMITATIONS

A. Conform to WisDOT Spec. 201.3, or as modified herein:
   1. Dispose of all cleared and grubbed material and debris outside the right-of-way at a location selected by the Contractor, except for trees and logs identified to be salvaged.

2. Disposal site should be a properly designated landfill area as determined by appropriate governmental agencies or lands under direct control of the Contractor.
3. Stripped materials not used for embankments shall be disposed off the Site.
4. On Site burial of any debris is not permitted.
5. On site burning of debris is not permitted.

3.06 PROTECTION

A. Conduct operations so as not to damage surrounding private property.

B. Protect trees intended to be saved from injury or defacement during operations:
   1. Restrict widths of utility trenches.
   2. Provide protective bracing, sheeting, or box to insure safe Work conditions as incidental to Contract.

C. Exercise care to keep salvaged material as clean as possible during operations.

D. Install temporary fencing at the construction limits and drip lines of trees to be protected prior to any construction activities in order to protect vegetation.

END OF SECTION

SECTION 31 23 00

EXCAVATION AND FILL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Excavation and fill for roadways, foundations, channels, ponds, and other areas.

B. Related Sections:
   1. Section 01 33 00 – Submittal Procedures
   2. Section 01 57 13 - Temporary Erosion and Sediment Control
   3. Section 02 41 13 - Selective Site Demolition
   4. Section 31 10 00 - Site Clearing
   5. Section 32 92 00 - Turf Establishment

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Measurement and payment shall be at the Bid Unit Price consistent with WisDOT Spec. 205.4 and 5, except as modified below.
   2. Common Excavation (EV): Measurement will be by volume of material in its original position, based on pre-construction cross sections and the design grading grade profile performed by the Engineer. Quantity shall be calculated and computed by the average end area method, using the original cross sections. Payment will include placing and compacting suitable material on Site and disposal of excess material off the Site:
      a. Removal of existing asphalt pavement will be paid separately per Section 02 41 13.
   3. Common Excavation (P): Measurement will be per plan quantity. Payment will include placing and compacting suitable material on Site and disposal of excess material off Site:
      a. Removal of existing asphalt pavement will be paid separately per Section 02 41 13.
   4. Excavation for replacement of sidewalks, trails, and driveways will be paid under the bid items for replacing those items
   5. Common Excavation (EV) – Trail or Sidewalk: Measurement will be by volume of material in its original position, based measurements performed by the Engineer at the time of construction. Payment will include all costs related to placing and compacting suitable material onsite and disposal of excess off site.
   6. Subgrade Excavation (EV): Measurement will be by volume of material in its original position, based on pre-construction and post-construction cross sections taken by the Engineer. Quantity shall be calculated by the average end area method. Payment will include excavation, disposal of excess material off the Site, and tolerancing the bottom of the excavated area.
   7. Subgrade Excavation (EV) – Trail or Sidewalk: Measurement will be by volume of material in its original position, based on pre-construction and post-construction cross sections taken by the Engineer. Quantity shall be calculated by the average end area method. Payment will include placing and compacting suitable material onsite and disposal of excess material off the Site.

8. Granular Backfill: Measurement will be by the ton of material compacted in place as determined from weight tickets delivered to the Engineer. Payment will include all costs related to furnishing and installing the material complete in place as specified:
    a. If the material is being wasted or placed excessively thick, the Owner reserves the right to deduct quantities that are in excess of plan thickness. Said quantities shall be based on material weighing 110 pounds per square yard of area per inch of thickness.
9. Granular Backfill – Trail or Sidewalk: Measurement will be by the ton of material compacted in place as determined from weight tickets delivered to the Engineer. Payment will include all costs related to furnishing and installing the material complete in place as specified:
    a. If the material is being wasted or placed excessively thick, the Owner reserves the right to deduct quantities that are in excess of plan thickness. Said quantities shall be based on material weighing 110 pounds per square yard of area per inch of thickness.
10. Boulevard Grading: Payment for this final Boulevard Grading, including placing, grading, and compacting topsoil, shall be made under the Bid Item included in the Bid Form based upon the number of hours actually spent grading:
    a. Initial backfilling of the curb is considered incidental to the installation of the curb.
    b. Payment for furnishing of topsoil will be made under the Topsoil Borrow Bid Item, per Section 32 92 00.
11. Haul Excess Reclaimed Material Offsite (LV): Measurement will be by the loose volume of material hauled offsite by means of a truck count. Payment will include all costs related to removing and disposing of material off the Site.
12. Payment for Placing Topsoil Borrow has been made in Section 32 92 00 – Turf and Grasses.
13. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WisDOT Spec.):
    1. 205 – Roadway and Drainage Excavation
    2. 207 – Embankment
    3. 208 – Borrow
    4. 209 – Granular Backfill
    5. 211 – Preparing the Foundation

1.04 SUBMITTALS

A. Submit the following items consistent with Section 01 33 00:
    1. Gradation tests for borrow materials.

1.05 DEFINITIONS

A. The definitions of the different classifications of excavation and borrow material shall conform to WisDOT Spec. 205.2, or as modified herein:
    1. Grading Grade: Bottom of the dense graded base as shown on the Drawings.
    2. Common Excavation: In locations where the design cross section is in a cut section, common excavation shall be classified as all excavation above the grading grade that has not been classified as another form of excavation in this Section. In areas where the design cross section is in a fill section, common excavation shall consist of excavation of topsoil.
    3. Subgrade Excavation:
        a. Excavation below the grading grade that has not been classified as another form of excavation in this Section.

b. Within a development where mass Site grading has been completed:
   1) Excavation and removal of soft and unstable soils below grading grade within an established rough graded roadway section. Such excavation will be as directed by Engineer during construction.

4. Rock Excavation: Includes rocks exceeding 1 cubic yard that are not decomposed, weathered, or shattered, and which require blasting, barring, wedging, or use of air tools for removal. Also included are any boulders, concrete, or masonry structure (except concrete pavement, curb, gutter and sidewalk).
5. Topsoil borrow material shall conform to Section 32 92 00 – Turf and Grasses.

1.06 QUALITY ASSURANCE

A. Assist testing laboratory by excavating for density tests. Assist testing laboratory with obtaining material samples.

1.07 SEQUENCING AND SCHEDULING

A. Perform excavation as soon as possible after public utility construction.

B. Complete subgrade for streets, driveways, walks, and parking lots immediately after trench backfill and compaction.

C. Provide notice by 3:00 pm of any granular backfill placement for the following day, to allow time for scheduling subgrade inspection and compaction tests prior to any granular backfill being placed.

D. Granular backfill placement shall not occur until the Boulevard has been graded to within 6" of finished grade per typical section.

PART 2 PRODUCTS

2.01 MATERIALS

A. Borrow: Conform to WisDOT Spec. 208.2:
   1. Soil which is capable of attaining specified compaction levels, excluding soils which contain organics, contain debris or are potentially expansive (CH or MH per the Unified Soil Classification System).

B. Granular Backfill: Conform to WisDOT Spec. 209.2.2 Grade 2.

PART 3 EXECUTION

3.01 GENERAL

A. Conform to WisDOT Spec. 205.3, or modified herein:
   1. Establish traffic control prior to excavations.
   2. Establish the specified erosion control devices according to Section 01 57 13 prior to all excavations.
   3. Notify utility companies of progress schedule so they can accomplish relocations, removals, and holding of lines.
   4. Perform removals consistent with Section 02 41 13.
   5. Strip topsoil consistent with Section 31 10 00.
   6. No borrow areas are allowed within City right-of-way.

3.02 PREPARATION OF EMBANKMENT

A. Conform to WisDOT Spec. 207.3, or as modified herein:
   1. Engineer's approval is required of all areas where preparation work has been performed prior to the placement of the embankment or fill material.
   2. Where embankment is to be constructed over swamp, marsh, or other locations where the foundation material is unstable, the foundation shall be excavated to remove all or part of the unstable material.

3.03 EXCAVATION OPERATIONS

A. Conform to WisDOT Spec. 205.3, or as modified herein:
   1. Perform excavations to the alignment, cross section, and grade as shown on the Drawings and staked by the Engineer.
   2. Excavation of unstable material below grade shall be done under the direction of the Engineer as the subsurface conditions are disclosed.
   3. Remove muck excavation material so as to minimize disruption to the bottom of the excavation.
   4. Notify Engineer immediately of any large boulders or ledge rocks encountered so proper measurement or profile can be made for pay quantities.
   5. No solid rock will be allowed within 12 inches of the subgrade.
   6. Provide and maintain temporary drainage facilities until permanent facilities are completed.
   7. After the roadway excavation is complete and prior to backfilling operations, notify the Engineer 24 hours in advance so all excavation areas can be cross-sectioned to determine quantities.
   8. Cut, fill, and grade Site to elevations and contours shown on the Drawings with allowances for pavements, topsoil, and structures.
   9. Mining of material in boulevards for use in street construction will not be allowed.
   10. Excess reclaimed material above and beyond that needed for the aggregate base shall be properly disposed of at a location off of the Site:
      a. The resulting reclaimed material could contain diesel range organics (DRO) which must be disposed of in accordance with WDNR requirements.

B. On street rehabilitation projects, excavation and disposal of the existing boulevard material to allow for the placement of the new concrete curb and gutter, and specified depth of topsoil/compost shall be considered incidental to the concrete curb removal Bid Item.

3.04 DISPOSITION OF EXCAVATED MATERIAL

A. Conform to WisDOT Spec. 205.3, or as modified herein:
   1. No disposition of asphalt millings will be permitted, unless thoroughly mixed with other on Site materials.
   2. If a reclamation process is used to remove pavement, the resulting reclaimed material could contain diesel range organics (DRO) which must be disposed of in accordance with WDNR requirements.
   3. Excavated material not used for embankments shall be disposed of off Project Site or as directed by the Engineer.

3.05 PLACING EMBANKMENTS

A. Conform to WisDOT Spec. 207:
   1. Topsoil placement shall conform to Section 32 92 00.

3.06 COMPACTING EMBANKMENTS

A. Conform to WisDOT Spec. 205.3.6, or as modified herein:
   1. Compaction required for embankment materials shall conform to the Special Compaction (nuclear) with the testing location and rates being determined by the Engineer.
   2. Backfilling of embankments shall be performed using on Site materials: If the Contractor is unable to meet the specified density requirements using that material due to excess moisture content, they shall immediately notify the Engineer of this condition.
   3. Recognize that inclement weather (sometimes heavy) occurs during the construction season and be responsible for protecting the moisture condition of soils during the construction phase. Such protection measures include sloping of exposed surfaces to promote runoff (avoid ponding) and compacting exposed surfaces prior to rain events to minimize infiltration.
   4. Compaction required for granular backfill materials shall conform to the Special Compaction (nuclear) with the testing location and rates being determined by the Engineer.

3.07 FINISH OPERATIONS

A. Conform to WisDOT Spec. 211, or as modified herein:
   1. Finish grading of grading grade prior to placement of dense graded base shall conform to the following tolerances:
      a. Not vary by more than 0.05 feet above or below he prescribed elevation at any point where a measurement is made.
   2. Finish grading of subgrade grade prior to placement of granular backfill shall conform to the following tolerances:
      a. Not vary by more than 0.10 feet above or below the prescribed elevation at any point where a measurement is made.
   3. Grading of the soils beneath the proposed topsoil shall be reviewed and approved by the Engineer prior to the start of the topsoil placement.

3.08 BOULEVARD GRADING

A. Backfill Curb After It Has Hardened:
   1. Leave the boulevards within a tolerance of 0.3 feet plus or minus of finish grade prior to installation of private underground utilities.
   2. Compact the backfill material directly behind the concrete curb to meet the requirements of "Standard Compaction."

B. Following installation of private underground utilities by others, re-grade entire boulevard area to the right-of-way, including the re-spreading of topsoil stockpiles located adjacent to the boulevard areas:
   1. It is intended that this work be done with 1 small dozer.
   2. The extent of the final work and the hours of work shall be reviewed with the Engineer prior to any grading being done.
   3. Compaction is required as part of the backfill procedure.

C. Reconstruction Projects:
   1. Grade, shape, and prepare boulevards disturbed by construction for topsoil and sod placement.
   2. Place, grade, and compact topsoil, minimum 4 inches thick.

3.09 FIELD QUALITY CONTROL

A. The Owner shall have an independent testing laboratory perform the following tests. The location of the tests shall be determined by the Engineer:
   1. Granular Backfill Material: 1 gradation test per 1,000 tons of material placed.
   2. 1 density test, monitored by Specified Density Method (nuclear), per 2,000 square yard of street constructed.

END OF SECTION

SECTION 31 23 13

SUBGRADE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Grading, shaping, and compacting subgrade prior to placing a base or surface course.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Subgrade Preparation: Measurement shall be by the units of square yards and shall be based on a width of 1 foot behind the back of curb, except as modified below. Payment at the Unit Price shall include all costs related to performing the Work in accordance with these Specifications, including shaping, grading, compacting, test rolling, and tolerancing.
   2. Subgrade Preparation - Trail or Sidewalk: Measurement shall be by the units of square yards and shall be based on a width of 1 foot behind the edge of trail or sidewalk, except as modified below. Payment at the Unit Price shall include all costs related to performing the Work in accordance with these Specifications, including shaping, grading, compacting, test rolling, and tolerancing:
      a. In locations where common excavation is performed, subgrade preparation shall be considered incidental to the Common Excavation Bid Item.
   3. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WisDOT Spec.):
   1. 205 – Roadway and Drainage Excavation.
   2. 207 – Embankment.
   3. 211 – Preparing the Foundation.
   4. 650 – Construction Staking.

1.04 SEQUENCING AND SCHEDULING

A. Perform subgrade preparation prior to placement of the aggregate base or aggregate backfill material.

B. Complete subgrade preparation for streets, driveways, walks, and parking lots immediately after installation of pipe as part of trench backfill and compaction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 GENERAL

A. Subgrade preparations shall be performed to produce the required density, grade, and cross-section.

3.02 PREPARATION

A. Inspection of subgrade by test rolling:
   1. The equipment used for test rolling shall be a Tandom Truck with a gross weight of 45,000 pounds.
   2. If rutting is greater than 1/2 inch, sub-grade excavation and aggregate backfill will be required.

3.03 COMPACTION

A. Conform to WisDOT Spec. 207.3.6.3, or as modified herein:
   1. For the Special Compaction, the Engineer will sample and test the soils to determine the Maximum Density and Optimum Moisture.
   2. The Owner will have an independent testing laboratory perform the following test, as minimum. The tests will be taken on the compacted subgrade at the location and testing rates designated by the Engineer. Nuclear density testing shall be considered an approved method:
      a) 1 density test for every 600 feet of street in the upper 3 feet of subgrade (100 percent density zone) at varying distances either side of centerline. Note: This is done if sub-grade excavation is not required.

3.04 FINISH OPERATIONS

A. Subgrade tolerance shall conform to WisDOT Spec. 650.3.3.3.6.2:

END OF SECTION

SECTION 32 01 16

FLEXIBLE PAVING REHABILITATION – RESTORATIVE SEALANT WITH REJUVENATING AGENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental to the rehabilitation of the existing asphalt surface with a restorative sealant with a rejuvenating agent.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Payment for accepted pavement rehabilitation will be at the contracted unit prices per lump sum for each location. Payment shall be full compensation for furnishing all labor, materials, equipment, tools, surface preparation, placement of materials, and cleanup.
   2. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

PART 2 PRODUCTS

2.01 MATERIALS

A. GSB-88 as manufactured by Asphalt Systems Inc, or approved equal, meeting the following requirements:
   1. Asphalt Emulsion: Provide a cationic slow set asphalt emulsion that contains a minimum of 20% gilsonite ore and a rejuvenating oil meeting the following specification criteria:

Undiluted Asphalt Emulsion Specifications:	
Saybolt Viscosity at 77°F (25°C) ASTM D-244:	20 to 100 seconds
Residue by Distillation 300°F, or Evaporation:	57% min.
Sieve test ASTM D-244:	0.2%
5-day Settlement test ASTM D-244:	5.0% max.
Tests on Residue from Distillation, or Evaporation:	
Viscosity astm 275°F (135°C) ASTM D-4402:	1750 cps max.
Solubility in 1,1,1 trichloroethylene ASTM D-2042:	97.5% min.
Penetration ASTM D-5:	50 dmm max.
Asphaltenes ASTM D-2007:	15% min.
Saturates ASTM D-2007:	15% max.
Polar Compounds ASTM D-2007:	25% min.
Aromatics ASTM D-2007:	15% min.

   2. Friction Material: The friction material shall be a dry, clean, hard, highly fractured slag or sand such as Blackjack 20-40.

PART 3 EXECUTION

3.01 GENERAL

A. Establish traffic control which is compatible to the operations being performed.

B. Clean asphalt surface so it is free of all debris immediately prior to beginning the Work at each location.

C. Hand spray around concrete curbs, driveway aprons, lights, etc.

D. Broom excess sand and remove all debris resulting from the Work.

3.02 DILUTION AND RATE OF SPREAD

A. The asphalt emulsion must be diluted with heated water prior to application to asphalt pavements. Two dilution rates are recommended as follows:
   1. 2-parts asphalt emulsion to 1-part water, or
   2. 1-part asphalt emulsion to 1-part water

B. The dilution and rate of spread is normally determined by the texture, porosity, and age of the asphalt pavement to be sealed in order to achieve the desired residual asphalt quantity:
   1. For 2:1 dilution 0.08 to 0.12 gallons per square yard is recommended.
   2. For 1: 1 dilution 0.10 to 0.15 gallons per square yard is recommended.

3.03 FRICTION MATERIAL

A. Sanding should be done at the same time the asphalt emulsion is applied in a single pass operation. Appy at approximately 0.15 to 0.50 pounds per square yard.

3.04 RESTRICTIONS

A. Conduct pavement rehabilitation operations between 7 A.M. and 7 P.M.

B. Sealant materials may be placed during a period of rising temperature after the air temperature in the shade and away from artificial heat has reach 40 degrees F and indications are for a continued rise in temperature. During a period of falling temperature, the placement of sealant material shall be suspended when the air temperature, in the shade and away from artificial heat, reaches 40 degrees F. Sealant shall not be placed when in the opinion of the Engineer; the weather or roadbed conditions are unfavorable.

C. Application of asphaltic emulsion to concrete curb surfaces and into City storm sewers is prohibited. Immediately remove said material.

D. Conduct the rehabilitation in a continuous operation.

3.05 PROTECTION

A. The Contactor shall be responsible for damage done to any adjacent driving surfaces, shoulders, or boulevards.

3.06 FIELD QUALITY CONTROL

A. Final results of rehabilitation subject to Engineer's approval.

B. Application time of rehabilitation is subject to the Engineer's approval.

C. Do not perform work if the Engineer determines the weather or surface conditions to be unfavorable.

END OF SECTION

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SECTION 32 01 17

FLEXIBLE PAVING REPAIR – SEALING CRACKS IN ASPHALT PAVING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental to the repairing of the existing asphalt surface improvements; including routing, cleaning and sealing the existing surface.
   2. Cracks to be sealed are defined as those cracks greater or equal to 0.25 inches (6-mm).

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Payment for accepted pavement crack routing, sealing, and dust control/reduction will be at the contracted unit prices per lump sum for each location. Payment shall be full compensation for furnishing all labor, materials, equipment, tools, incidentals used for dust control, surface preparation, placement of materials, and cleanup.
   2. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Whenever reference is made to the Wisconsin Department of Transportation Standard Specifications, such reference shall mean "Standard Specifications for Highway and Structure Construction" 2019 Edition (WisDOT Spec.) and all subsequent revisions and supplements. The word "Engineer" is understood to refer to the Engineer for the Owner:
   1. Section 455 – Asphaltic Materials
   2. Section 475 – Seal Coat

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphaltic Material: Conform to WisDOT Spec. 455, or as modified herein:
   1. Sealant material: Use a sealant material with fiber reinforcement manufactured for the sealing of pavement crack and joints. Deliver the sealant in the manufactures original sealed container legibly marked with the following information:
      a. Manufacture's name
      b. Trade name of sealant
      c. Manufacturer's batch or lot number
      d. Minimum application temperature
      e. Maximum (or safe) heating temperature
   2. Prior to commencing work, provide the engineer with a certificate of compliance along with a copy of the manufacturer's recommendations pertaining to heating and application of the sealant.

PART 3 EXECUTION

3.01 GENERAL

A. The completed joint repair treatment shall have a homogenous appearance and a uniform texture.

B. Material shall not be placed in wet conditions. Any material that becomes wet/contaminated prior to proper curing shall be removed at replaced by the Contractor at the Contractor's expense.

C. Establish traffic control which is compatible to the operations being performed.

D. Remove all debris resulting from the Work.

E. A copy of the manufacturer's recommendations pertaining to the heating and application of the joint sealant material shall be submitted to the Engineer prior to the commencement of work. These recommendations shall be adhered to and followed by the contractor. The temperature of the sealer in the field application equipment shall never exceed the safe heating temperature recommended by the manufacturer. Any given quantity of material shall not be heated at the pouring temperature for more than six hours and shall never be reheated. Sealing shall not proceed if the temperature of the material has not reached or has fallen below the manufacturer's recommended minimum application temperature.

3.02 RESTRICTIONS

A. Conduct crack sealing operations between 7 A.M. and 7 P.M.

B. Sealant materials may be placed during a period of rising temperature after the air temperature in the shade and away from artificial heat has reach 40 degrees F and indications are for a continued rise in temperature. During a period of falling temperature, the placement of sealant material shall be suspended when the air temperature, in the shade and away from artificial heat, reaches 40 degrees F. Sealant shall not be placed when in the opinion of the Engineer; the weather or roadbed conditions are unfavorable.

C. Application of asphaltic material to concrete curb surfaces and into City storm sewers is prohibited. Immediately remove said material.

D. Conduct the crack sealing operations so that routing, cleaning and sealing is a continuous operation. Traffic shall not be allowed to kneed together or damage the reservoir once it has been created. Routed cracks not sealed before traffic is allowed on the surface shall be re-routed at no additional cost to the Owner.

3.03 SAWCUTTING OF JOINTS

A. Dry or wet cutting is allowed.

B. Joint Reservoir Size:
   1. Route and Seal: ¾-inch wide, ¾-inch depth.

C. Route and seal joints shall include all existing random joints, longitudinal or transverse with a width less than 3/4 of an inch.

D. Dust Suppression:
   1. When performing cutting or routing operations equipment must be fit with a dust suppression system capable of meeting the Occupational Safety and Health Administration (OSHA), Respirable Crystalline Silica construction standard, 29 CFR § 1926.1153. The dust suppression system must be attached to the routers/cutters directly to avoid any leakage of dust. The debris path created shall be confined to a windrow of approximately 8 inches (20.3 cm) for easy clean-up. Routed surfaces of cracks are subject to acceptance or rejection at the Engineer's discretion.
   2. Any contractor not following these guidelines will be stopped from doing any further work until the requirement is met. No compensation for lost time due to the enforcement of these guidelines will be granted.

3.04 SURFACE PREPARATION

A. Dry Sawed Joints:
   1. Clean thoroughly with a 100-psi air blast to remove any dust, dirt, or deleterious matter adhering to the joint walls or in the joint cavity.
   2. Blow or brush the dry dust and material off the pavement surface.

B. Wet Sawed Joints:
   1. Clean thoroughly with a 50-psi water blast immediately after sawing to remove any slurry dirt or deleterious matter adhering to the joint walls or in the joint cavity.
   2. Dry with a 100-psi air blast.
   3. Re-clean joint with a water blast if the air blast produces dirt or other residue from the joint cavity.
   4. Immediately flush all sawing slurry from the pavement surface.

C. Apply an emulsified asphaltic tack to the existing surface prior to placement of crack surface treatment.

3.05 APPLICATION

A. The application rates shall be in accordance to the manufacturer's requirements for the specific equipment being used.

B. The rates shall be reviewed by the Engineer prior to application.

C. The routing, cleaning and sealing shall extend the full width of the surface on transverse cracks.

D. Protect the completed Work for the full amount of time required for curing of the materials placed as well as during cleaning operations.

E. After the cracks have been properly cleaned, the Contractor shall install crack sealant and protect

3.06 PROTECTION

A. Conform to WisDOT Spec. 475.3.6, except as modified herein:
   1. The Contactor shall be responsible for damage done to any adjacent driving surfaces, shoulders, or boulevards.

3.07 FIELD QUALITY CONTROL

A. Final results of cleaning joint subject to Engineer's approval.

B. Application time of sealing is subject to the Engineer's approval.

C. Do not place sealants if the Engineer determines the weather or surface conditions to be unfavorable.

END OF SECTION

SECTION 32 11 23

DENSE GRADED BASE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Requirements for dense graded base course on a prepared subgrade and gravel driveway patching.

B. Related Sections:
   1. Section 31 23 00 - Excavation and Fill
   2. Section 21 23 13 – Subgrade Preparation

1.02 PRICE AND PAYMENT PROCEDURE

A. Conform to WISDOT Spec. 305.4 and 305.5 for measurement and payment or as modified herein:
   1. Base Aggregate Dense 1 ¼ Inch: This Bid Item is for dense graded base placed in the streets. Measurement will be by the ton of material compacted in place as determined from weight tickets delivered to the Engineer.
   2. Base Aggregate Dense 1 ¼ Inch – Trail or Sidewalk: Measurement will be by the ton of material compacted in place as determined from weight tickets delivered to the Engineer.
   3. Finish Grading – Street: Measurement will be by the square yard of surface area to be paved on urban street sections or by the square yard of the surface area of the aggregate graded on rural street sections.
   4. Finish Grading – Trail or Sidewalk: Measurement will be by the square yard of surface area of the aggregate.
   5. Patch Gravel Driveway: Measurement will be by the ton of material compacted in place as determined from weight tickets delivered to the Engineer. Payment will include all costs related to patching the driveway, including excavation and dense graded base.
   6. If the material is being wasted or placed excessively thick, the Owner reserves the right to deduct quantities that are in excess of Drawing thickness. Said quantities shall be based on material weighing 110 pounds per square yard of area per inch of thickness.
   7. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WISDOT Spec.):
   1. 301 – Base, Subbase, and Subgrade Aggregate.
   2. 305 – Dense-Graded Base.

1.04 SUBMITTAL

Submit gradation report on sample of aggregate base to be used.

1.05 DEFINITIONS

A. Finish Grading: Grading, shaping, compacting, and tolerancing of existing dense graded base, pulverized material, existing dense graded base that has been supplemented with dense graded base, or pulverized material that has been supplemented with dense graded base.

1.06 SEQUENCING AND SCHEDULING

A. Construct dense graded base only after all of the following have been completed:
   1. Subgrade excavation, common excavation, and/or subgrade preparation has been completed and toleranced (string lined).
   2. Subgrade has been corrected for instability problems and successfully passed a "roll test" performed by the Contractor and witnessed by the Engineer, and checked for conformance to line and grade tolerances (string lined).
   3. The Boulevard has been graded to within 6 inches of finished grade per typical section.
   4. Minimum 400 LF of roadway granular backfill has been placed, compacted, shaped, graded, and checked for conformance to line and grade tolerances (string lined).

B. Provide notice by 3:00 pm of any dense graded base placement for the following day, to allow time for scheduling subgrade or granular backfill compaction testing prior to any dense graded base being placed.

C. Final grading and shaping of dense graded base prior to placing pavement surface shall not be performed until initial curb backfilling is complete.

PART 2 PRODUCTS

2.01 MATERIALS

A. Streets, Trails and Sidewalks:
   1. Dense Graded Base: Conform to WisDOT Spec. 305, 1 ¼-inch, 100% crushed stone:
      a. Crushed concrete allowed up to 30% by weight.

B. Driveway and Shouldering:
   1. Dense Graded Base: Conform to WisDOT Spec. 305, 3/4-inch, 100% crushed stone.

PART 3 EXECUTION

3.01 GENERAL

A. Finish Grading:
   1. Grading, shaping, compacting, and tolerancing existing material from 0 to 2-inch depth.

3.02 PREPARATION

A. Street:
   1. Prepare the subgrade in accordance with Section 31 23 13.
   2. Prepare the surface of the granular backfill in accordance with Section 31 23 00.

B. Subgrade or surface of granular backfill to be completed and approved by the Engineer prior to installation of dense graded base.

3.03 CONSTRUCTION REQUIREMENTS

A. Conform to WisDOT Spec 305.3, except as modified below:
   1. Streets and Shoulders: Compaction shall conform to 301.3.4.3 – Special Compaction, except each layer shall be compacted to 100% of the determined maximum density using a Standard Project Test.
   2. Trails, Sidewalks, Driveways: Compaction shall conform to 301.3.4.2 – Standard Compaction.
   3. Install dense graded base in accordance with details on Drawings.
   4. Deliver weight tickets to Engineer daily.
   5. Patch gravel driveways to the thickness shown on the Drawings.

3.04 FIELD QUALITY CONTROL

A. The Owner shall perform Agency Verification Testing (QV) by use of an independent testing laboratory to sample the dense graded base materials, determine the moisture/density relationships, gradations, and perform nuclear density testing to determine field moisture and field density at locations determined by Engineer. The following are minimum testing rates:
   1. 1 gradation test per 500 ton of material placed.
   2. 1 density test per 2,000 square yards of gravel surface, minimum 3 density tests per Project.
   3. 1 moisture test per Project during compaction.
   4. Density testing at the curb lines prior to concrete curb and gutter placement is at the discretion of the Engineer.

B. The Owner shall perform Agency Verification Testing (QV) by use of an independent testing laboratory to sample pulverized dense graded base materials, determine the moisture/density relationships, gradations, and perform nuclear density testing to determine field moisture and field density at locations determined by Engineer. The following are minimum testing rates:
   1. 1 gradation test per 500 ton of material placed.
   2. 1 density test per 2,000 square yards of gravel surface, minimum 3 density tests per Project. Full depth reclamation (Shear Strength Method) density testing if depth of reclaimed gravel is greater than 8 inches.

C. The Owner will not allow a "Roll Test" as a method of measuring acceptance of the final dense graded base surface.

D. Line and Grade Tolerance for Dense Graded Base or Pulverized Dense Graded Base: The final surface will be checked for conformance to specified tolerances by the "stringline" method. Grade shall be $\pm$ 0.03 feet of grade. Notify Engineer a minimum of 4 hours (one half day) prior to paving to allow for the "Field Quality Control" tolerance check.

E. Line and Grade Tolerance for Trail and Sidewalk: The final dense graded base surface needs to be graded and toleranced. Grade tolerance shall be ±3/8 inch as measured with a 10-foot straight edge. Notify Engineer a minimum of 4 hours (one half day) prior to paving to allow for the "Field Quality Control" tolerance check.

3.05 PROTECTION

A. Protect dense graded base until it is covered by surface pavement.

B. Keep dense graded base free of ruts and irregularities until covered by surface paving.

C. Place water on dense graded base for dust control as required, to eliminate nuisance conditions for adjacent properties.

END OF SECTION

SECTION 32 11 25

ASPHALTIC PAVEMENT PULVERIZING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Pulverization of the existing asphalt pavement and a portion of the underlying existing base material.

B. Related Sections:
   1. Section 31 23 00 - Excavation and Fill.
   2. Section 32 11 23 – Dense Graded Base.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment
   1. Pulverize and Relay: Measurement will be by the square yard, based on the width of the existing pavement, regardless of depth of reclamation required:
      a. Payment for leveling and compaction of the material immediately after it is pulverized is to be included in the Bid Unit Price per square yard.
      b. The Bid Unit Price is to include the motor grader and any water necessary to maintain the pulverized material until paved.
   2. Finish grading and tolerancing of the pulverized material prior to paving shall be per Section 32 11 23.
   3. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition including all current supplements (WisDOT):
   1. Section 305 – Dense Graded Base
   2. Section 325 – Pulverized and Re-laid Pavement

1.04 SEQUENCING AND SCHEDULING

A. Pulverizing will be performed at locations shown on the drawings.

B. Provide a 48-hours notice prior to beginning the pulverizing process.

C. Initial grading/leveling and interim compaction of the pulverized material by a motor grader and rubber-tired roller is required immediately following the pulverizing process.

D. Maintain access to all residents during the pulverizing and tolerancing process.

PART 2 PRODUCTS

2.01 MATERIALS

A. Reclaimed material – Pulverized Aggregate:

1. Pulverize the full depth of the existing asphalt pavement and underlying base materials until 97% or more pass 2-inch sieve size.

B. Contractor's Gradation Quality Control (QC):

1. The Contractor shall be responsible for gradation control by testing the pulverized material at a rate of 1 test per 5,000 square yards, with a minimum 1 test per day.
Provide the Engineer a verification sample for Quality Assurance testing at the discretion of the Engineer. This shall be a split sample taken by the Contractor.

PART 3 EXECUTION

3.01 GENERAL

A. Create an aggregate base course composed of the existing asphalt pavement and a portion of the existing underlying base material.

B. The reclamation process cannot be performed during rain events. Compact reclaimed material prior to rain events.

C. The pulverizing process cannot be performed during rain events. Compact pulverized material prior to rain events.

D. Disposal of the oversize asphaltic pieces, within the Right-of-Way, will not be permitted. Any oversize asphaltic pieces found in the Right-of-Way shall be removed by the Contractor and at the Contractor's expense.

3.02 PREPARATION

A. Finish grading, compaction, and tolerancing of the pulverized material shall be per Section 32 11 23.

B. Removal of excess pulverized material shall be per section 31 23 00.

3.03 COMPACTION

A. Compaction of the pulverized material shall conform to Section 32 11 23.

B. Control moisture content of pulverized material 3 to 7 percent by dry weight during the initial leveling/compaction and final shaping and tolerancing process as incidental to pulverizing.

C. The maximum reclaimed layer thickness for compaction shall be 8 inches.

3.04 EQUIPMENT

A. Notify the Engineer of the equipment to be used at the preconstruction conference:
1. Equipment to be hydrostatically driven.

2. Computerized operation controls.
3. Rotating cutter drum to operate parallel to the existing road surface, providing a uniform section across the entire roadway.
4. Capable of cutting up to a 12-inch depth in 1 pass.
5. Uniformly blend the pulverized material.
6. Equipment exhaust must be on the top and not the side.

3.05 THICKNESS REQUIREMENTS

A. All other streets:
   1. Typical reclaimed section varies. Refer to typical sections on Drawings.

END OF SECTION

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SECTION 32 12 01

FLEXIBLE PAVING (MUNICIPAL PROJECTS)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Hot plant mixed asphalt-aggregate mixtures for hot mix asphalt courses.
   2. Tack coat.

B. Related Sections:
   1. Section 01 57 13 - Temporary Erosion and Sediment Control
   2. Section 02 41 13 - Selective Site Demolition
   3. Section 31 23 00 - Excavation and Fill
   4. Section 32 11 23 – Dense Graded Base
   5. Section 33 05 17 - Adjust Miscellaneous Structures

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Method of measurement and payment shall conform to WISDOT Specification 450.4, 450.5, 455.4, 455.5, 460.4, 460.5, 465.4, and 465.5, except as modified herein.
   2. Tack Coat:
      a. Measured by volume in gallons at 60 degrees F.
      b. Payment for asphalt material used for Tack Coat includes compensation in full for all costs incidental to the furnishing and application at the Bid Unit Price per gallon.
      c. Cleaning of all debris and dirt from the previous asphalt surfaces prior to placement of Tack Coat is included in the Bid Unit Price for Tack Coat.
      d. Payment for the accepted quantity of asphalt emulsion shall be at the Contract price per unit of measure for undiluted asphalt emulsion.
      e. Payment for tacking exposed edges of existing asphalt surfaces and concrete curb and gutter in conjunction with initial lift placement is considered incidental to the placement of the initial lift.
   3. Hot Mix Asphalt:
      a. Measured by the weight in tons of material placed and accepted for each specified Bid Item as stated in the Bid Form. Payment shall be made in accordance with the acceptance and payment schedules provided in WisDOT Specification 460 Hot Mix Asphalt Pavement.
      b. The Bid Unit Price includes both the asphalt course mixture and asphalt binder material.
      c. Partial payment will not exceed 70 percent of the total calculated payment until the required testing and product documentation is received and found to be acceptable to the Engineer.
      d. Payment for the asphalt final lift will not be made until the corresponding signing and pavement markings have been installed.
      e. No recycled material is allowed in Bid Items labeled special.
   4. Preparation of Asphalt Initial Lift consists of final clean up of the asphalt initial lift prior to paving final lift:
      a. Street Sweeper with power pickup broom, including operator: per hour.
      b. Skidsteer (Bobcat), including operator: per hour.

5. Patch Asphalt Driveway and Patch Asphalt Trail: Measurement will be by the square yard. Payment will include all costs related to patching the driveway or trail to the thicknesses shown on the Drawings, including excavation, subgrade preparation, dense-graded base, and the asphalt surface course:
    a. Saw cutting just prior to paving will be paid separately, per Section 02 41 13.
    b. Removing asphalt pavement will be paid separately, per Section 02 41 13.
6. Remove and Replace Asphalt Driveway and Remove and Replace Asphalt Trail: Measurement will be by the square yard. Payment will include all costs related to patching the driveway or trail to the thicknesses shown on the Drawings, including sawcutting just prior to paving per Section 02 41 13, removing asphalt pavement per Section 02 41 13, excavation and subgrade preparation, dense-graded base, and the asphalt surface course.
7. Patch Asphalt Street: Measurement will be by the square yard. Payment will include all costs related to patching the street to the thicknesses shown on the Drawings, including excavation, aggregate backfill, dense-graded base, asphalt initial lift(s), tack coat(s), and asphalt final lift:
    a. Saw cutting just prior to paving will be paid separately, per Section 02 41 13.
    b. Removing asphalt pavement will be paid separately, per Section 02 41 13.
8. Remove and Replace Asphalt Street: Measurement will be by the square yard. Payment will include all costs related to patching the street to the thicknesses shown on the Drawings, including sawcutting just prior to paving per Section 02 41 13, removing asphalt pavement per Section 02 41 13, excavation and subgrade preparation, aggregate backfill, dense-graded base, asphalt initial lift(s), tack coat(s), and asphalt final lift.
9. Asphalt Wedge: Measurement will be by weight in tons of material placed and accepted. Payment will include all costs related to constructing the Asphalt Wedge per the Standard Detail and as specified:
10. Asphalt saw cutting or milling that is required for joint construction will be paid per Section 02 41 13:
    a. Removal of temporary asphalt ramps is considered incidental to the sawing asphalt pavement or milling Bid Item.
11. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" 2019 Edition (WisDOT Spec.) and "Construction and Materials Manual" 2018 Edition (WISDOT Spec.):
    1. 450 – General Requirements for Asphaltic Pavements.
    2. 455 – Tack Coat.
    3. 460 – Hot Mix Asphalt Pavement.
    4. 465 – Asphaltic Surface.

1.04 SUBMITTALS

A. Submit mixture design report(s) to the Engineer at the preconstruction conference that will be used on the Project If mix design is not available at the time of the preconstruction conference, submit mix design at least 15 days prior to commencement of paving.

B. Submit mix design report for all projects, regardless of the size of the project.

C. Submit Q/C results in accordance with WisDOT Spec. 460.2.8 – Quality Management Program.

1.05 SEQUENCING AND SCHEDULING

A. Prime Contractor is responsible for scheduling an onsite pre-paving meeting with the Owner, Engineer, Paving Subcontractor (if appropriate), including the Paving Forman a minimum 24 hours prior to the paving operations.

B. Provide 48-hour notice for scheduling and noticing of the residents prior to paving operations.

C. Provide notice by 2:00 pm the day prior to any asphalts placement to allow for scheduling of the following activities. Notice must include mix designation, start time of placement, plant producing mix, and Forman onsite during paving operations:
   1. Dense-graded base tests (per Section 32 11 23) prior to any asphalt being placed.
   2. Inspection of paving operations by a City representative, no paving will be allowed or accepted without inspection.
   3. Asphalt plant testing if required

D. Dense graded base and concrete curb and gutter to be completed and approved by the Engineer prior to placement of asphalt surfaces.

E. Concrete pedestrian ramps to be completed and approved by the Engineer prior to placement of asphalt trail:
   1. Concrete pedestrian ramps must be protected during paving of asphalt trail. Method of protection must be approved by the Engineer.

F. Sweeping of pavement must occur immediately prior to placement of the final lift. Swept surface must be approved by the Engineer prior to the placement of the final lift.

G. Adjust structures prior to placement of asphalt wedge as specified in Section 33 05 17.

H. Asphalt wedge must be completed before private utility installation begins.

I. Adjust structures prior to placement of asphalt final lift as specified in Section 33 05 17.

J. Nuclear density testing shall be taken within 48 hours after paving operations.

K. Patch asphalt driveways within 7 calendar days of initial removal, or per applicable Milestones in Section 00 52 10, Article 4.

L. Sidewalks, trails, and final restoration must be completed prior to final lift paving.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mixture Designation: Conform to WisDOT Section 460.3.1, except as modified in the typical section and Bid Form:
   1. Residential Streets (Low Volume):
      a. Initial Lift = 4 LT 58-34 H
      b. Final Lift = 5 LT 58-34 H
   2. All other streets: refer to the Bid Form and the typical sections on the Drawings.
   3. Driveways, Trails, Parking Lots, and Patching: 4 LT 58-28 S
   4. Asphalt Wedge = 4 LT 58-28 S

B. Conform to WisDOT Section 460.2.2 Aggregate for Hot Mix Asphalt except as modified herein:
   1. Recycled Asphalt Shingles (RAS) are not allowed in the upper course mixtures.

C. Tack Coat:
   1. Tack Coat: Conform to WisDOT Spec. 455:
      a. Emulsified Asphalt, CSS-1 or CSS-1h.

D. Asphalt Binder Material: Conform to WisDOT Spec. 455.2.4.1 and as identified in the Mix Designation.

E. Mixture Design: Conform to WisDOT Spec. 460.2.7.

F. Mixture Quality Management (Quality Control/Quality Verification): Conform to WisDOT Spec. 460.2.8., except as modified herein:
   1. Quality Verification testing will be completed at the discretion of the Engineer, testing rates will not exceed Spec. 460.2.8.2.1.3.1.

PART 3 EXECUTION

3.01 GENERAL

A. Conform to the requirements of WisDOT Spec. 460.3, except as modified herein.

B. Review the proposed paving sequence with the Engineer prior to placement of each asphalt course (lift).

C. The proposed sequence shall address the: longitudinal seams, compaction, traffic control, hauling routes, and placement of pavement markings.

D. Preparation of Asphalt Lower Lift:
   1. Final clean up of the asphalt surface with the use of a power pickup broom and front end loader/skidsteer.
   2. Street sweeping operations must include the application of water to effectively make the pavement free and clear of material and debris to allow for successful application and adhesion of tack coat to the pavement. The appropriate amount of water shall be applied, eliminating dust as part of the sweeping operations.

E. Adjust structures conforming to the requirements of Section 33 05 17:
   1. Have a valve wrench on site during the paving operations for the purpose of final adjustments to the valve boxes to meet the specified tolerances. This work shall be considered incidental to the valve box adjustment bid item.

F. Joints: Where new construction meets existing asphalt surfacing, the existing surface shall be uniformly milled or saw-cut straight, and tack coat applied prior to placement of each asphalt course (lift):
   1. For joint construction, an existing asphalt surface shall be considered to include any asphalt surface not paved on the same day as the new construction. The Owner may require milling or sawcuting on surfaces paved the same day, if, in the opinion of the Owner, the mix has cooled to a point where a new milled or sawed edge is necessary
   2. Construct 2-foot wide (min.) ramp where new construction does not match existing construction (i.e. initial lift to final lift).

G. Finish asphalt surface shall be flush with concrete surface at curb depression for pedestrian curb ramps.

3.02 RESTRICTIONS

A. Conform to WisDOT Section 450.3.2.1.1, except as modified herein.

B. Following the street sweeping operations, the condition of the pavement surface must be approved by the Engineer prior to paving.

C. Existing asphalt surfaces must be dry prior and during placement of any asphalt pavements.

D. Asphalt surfaces shall not be constructed on frozen gravel base.

E. Final Lift shall not be placed when the air temperature in the shade and away from artificial heat is 50 degrees or less, unless otherwise approved by City Engineer.

3.03 EQUIPMENT

A. Conform to WisDOT Section 450.3.1, except as modified herein.
   1. Patching asphalt trails greater than 20 feet in length requires the use of a self-propelled paver.
   2. Patching asphalt street greater than 20 feet in length and 10 feet in width requires the use of a self-propelled paver.

3.04 TREATMENT OF SURFACE

A. Tack Coat shall conform to WisDOT Spec. 455, except as modified herein.

B. Restrictions:
   1. The tack coat shall not be applied when the road surface is wet or when the weather conditions are unsuitable.
   2. The area for tack coat application shall be limited as directed by the Engineer.
   3. The Contractor shall have sole responsibility of claims of tack coat on personal property due to lack of notification or signage of the area being tack coated.
   4. No tack coat prior to placement of asphalt wedge.
   5. Cleanup of tack coat material tracked and build up onto adjacent roadway surfaces by truck hauling shall be performed on a daily basis, or as directed by the Engineer.

C. Tack Distributors: Conform to WisDOT Spec. 455.3.2.2, except as modified herein:
   1. The Engineer at anytime can direct the Contractor to perform test strip to determine if the equipment is applying the specified application rate for the emulsion. All cost associated with this test strip is considered incidental to the tack application.

D. Road Surface Preparation: Conform to WisDOT Spec. 455.3.2.3.

E. Application:
   1. At a uniform rate conforming to WisDOT Spec. 455.3.2.4, but not greater than 0.07 gallon per square yard, new asphalt.
   2. Along the front edge of the concrete curb and gutter, prior to placement of asphalt initial lift.

3.05 PAVEMENT DENSITY

A. Conform to WisDOT Spec. 460.3.3, except as modified herein:
   1. Trails, Driveways, Small Parking Lots, Leveling Courses, Asphalt Wedge, and Patching shall conform to Section 450.3.2.6.2 – Ordinary Compaction.
   2. All other Pavement Density shall conform to Section 460.3.3 – HMA Pavement Density Maximum Density Method.
   3. Contractor shall provide the target maximum density to the Engineer at the start of paving operations.

B. Vibrating steel drum roller and a pneumatic tired roller employed in conjunction with each other during compaction of the final surface course.

3.06 THICKNESS REQUIREMENTS

A. Conform to WisDOT Section 460.3.2 and the typical sections on the Drawings.

B. After compaction, the thickness of each course shall be within ¼ inch of the thickness shown on the Drawings.

C. The portion of any course constructed more than the maximum allowable ¼ inch will be excluded from pay quantities or may require removal and replacement at the direction of the Engineer.

D. The Engineer may require end of Project core samples for verification of pavement thickness and uniformity.

E. Structure Adjustment – Conform to Section 33 05 17 for tolerances.

3.07 TEMPORARY ASPHALT WEDGE

A. Where concrete curb and gutter is installed, construct a temporary asphalt mat meeting the following requirements:
   1. Construct with a 4 LT mixture.
   2. 8 or 10 feet wide from front edge of concrete curb and gutter.
   3. Thickness to be 1/4 inch over curb and taper to meet the lower asphalt mat elevation.

B. Install silt fence behind curb adjacent to asphalt wedge per Section 01 57 13 and the Standard Detail.

3.08 PATCH ASPHALT STREET, DRIVEWAY, OR TRAIL

A. Perform patching at locations shown on the Drawings or as directed by Engineer:
   1. Remove existing asphalt per Section 02 41 13.
   2. Saw cut existing asphalt per Section 02 41 13.
   3. Excavate to the bottom of the dense graded base or granular backfill layer as shown on the Drawings and dispose of material per Section 31 23 00.
   4. Place granular backfill, as required, per Section 31 23 00.
   5. Place dense graded base per Section 32 11 23.
   6. Place asphalt pavement.

END OF SECTION

SECTION 32 12 36

SEAL COAT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental to the application of an asphaltic material followed by placement of an aggregate material cover on an existing asphalt pavement as indicated on the Drawings or as specified herein.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Seal Coating: Measurement shall be by the lump sum for each location acceptably completed. Payment shall include the following:
   a. Asphaltic material:
      1) Delivery of material
      2) Distributor calibration
      3) Distribution and application
   b. Seal coat aggregate:
      1) Delivery and stockpile of aggregate
      2) Initial aggregate testing
      3) Specified surface preparation
      4) Calibration of aggregate spreader
      5) Hauling and spreading of aggregate
      6) Rolling and compaction of aggregate
      7) Sweeping (3 times)
   c. Traffic control, removal of existing pavement markings, and temporary pavement markings.
2. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WisDOT Spec.):
1. 475 – Seal Coat

B. American Water Works Association (AWWA):
1. D2397 – Standard Specification for Cationic Emulsified Asphalt

1.04 SEQUENCING AND SCHEDULING

A. All repairs to existing asphalt pavement shall be completed as directed by the Engineer prior to application of seal coat.

B. Aggregate must be delivered and stockpiled 14 days prior to the start of the construction to allow the Owner time to perform the necessary testing.

C. Aggregate stockpiling shall be as indicated on the Drawings or as directed by the Engineer.

D. Prior to starting work, meet with Engineer and Owner to discuss the method and means of material supply, a work schedule, and a general review of the Specifications.

E. Clean existing asphalt pavement with power pick-up broom and front skidsteer (bobcat) or front-end loader.

F. 72 hours in advance of the seal coating operations for a given location, notify adjacent property owners of the parking restrictions and street use during the seal coat operation.

G. The Contractor shall be aware of the weather forecast. Seal coating shall **not** be performed if rain is predicted within four hours of applying the seal coat.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphaltic Material: Rapid setting CRS-2P emulsified oil conforming to ASTM D2397

B. Seal Coat Aggregate: ¼ inch Dresser trap rock, or approved equal

PART 3 EXECUTION

3.01 GENERAL

A. Prospective bidders are advised to inspect all streets and verify existing conditions to their own satisfaction prior to submitting a Bid.

3.02 RESTRICTIONS

A. Conform to WisDOT 475.3, except as modified herein:
   1. Conduct seal coating operations between 7:00 a.m. and 7:00 p.m.
   2. The City prohibits the indiscriminate use of all water hydrants by persons other than the City's personnel.
   3. Assign at least one laborer strictly to walk behind the chip spreader operation to hand broom or clean up any missed are or piles of aggregate.
   4. Application of asphalt material to concrete curb surfaces and into City storm sewers is prohibited. Contractor is responsible for the immediate removal of said material.
   5. Prevent overlapping of seal coat onto other newly placed seal coat layers.

3.03 EQUIPMENT

A. Conform to WisDOT 475.3.2, except as modified herein:
   1. Aggregate spreader shall be self-propelled and computerized with variable width up to 24 feet.
   2. The sweeping broom shall be a power pick-up broom.
   3. No seal coating operations will be permitted until all necessary and required equipment is on site and functioning.

3.04 SURFACE PREPARATIONS

A. All street surfaces shall be carefully cleaned, scraped, swept, and approved by the Engineer prior to seal coating. Remove all objectionable foreign matter, including weed growth, on the road surface.

B. Application of water may be required to minimize the creation of air borne dust and to assist in the sweeping and cleaning operation.

C. Hand clean up as necessary.

D. Cover all manhole and gate valve box covers with fine aggregate or sand prior to seal coating, so the seal coat material does not adhere to the cover surface.
   1. Clean all fine aggregate and seal coat material from covers once work is completed.
   2. Dispose of the material at an acceptable location outside the City limits.

3.05 ASPHALTIC MATERIAL APPLICATION

A. Conform to WisDOT 475.3.4, except as modified herein:
   1. Modify application rates only as directed by the Engineer or authorized representative.
   2. Application rate: between 0.32 and 0.35 gallons per square yard.
   3. Application temperature of material: between 125 and 175 degrees F.
   4. Traffic is not permitted on fresh, uncovered asphaltic material.

3.06 AGGREGATE APPLICATION

A. Conform to WisDOT 475.3.5, except as modified herein:
   1. Modify application rates only as directed by the Engineer or authorized representative.
   2. Application rate: between 25 and 30 pounds per square yard.
   3. Perform the test strip and calibration of the chip spreader in accordance with the "Standard Method for Determining the Transverse Spread Rate for Surface Treatment Application (Modified Method ASTM D5624-95):
      a. Complete this procedure on the first day of seal coat application and one additional time during construction as requested by the Engineer.
      b. All costs associated with this test are considered incidental to the Project.
   4. Hand spreading or brooming of seal coat aggregate will be required of the Contractor where non-uniform application occurs and in small irregular areas.

3.07 ROLLING OPERATIONS

A. Conform to WisDOT 475.3.5, except as modified herein:
   1. Rolling operations shall be performed to allow the aggregate to properly be embedded into the binder material prior to the binder "breaks".
   2. A minimum of three rollers is required with pneumatic tires no less than 60 psi.
   3. Compact for a minimum of five passes over all areas.
   4. Roller speed not to exceed 5 mph.
   5. Initial pass of pneumatic tire roller shall be made within two minutes of spreading aggregate.
   6. Rolling operations shall be completed within 30 minutes after binder has been sprayed.

3.08 INITIAL SWEEPING OF EXCESS AGGRGATE

A. Sweep and remove excess aggregate from the streets and dispose of material off the Site.

B. Begin sweeping operations approximately three days after seal coat has been allowed to set up:
   1. Engineer to determine the exact date to begin sweeping operations.

C. If sweeping has not been completed within the time specified above, a penalty of $500 per calendar day will be charged until the sweeping is complete.

D. Utilize more than one power pick-up broom, if necessary, to meet the time requirement.

3.09 PROTECTION

A. Contractor is responsible for damage done to any adjacent driving surfaces, shoulders, or boulevards.

B. Traffic Control:
   1. Install and maintain warning signs at the entrances to developments or the ends of the streets being seal coated:
      a. Signs shall be 30”x30” with the wording “Loose Gravel” and “No Parking”:
         1) Post all streets in the project area for temporary no parking.
         2) Signs shall indicate the dates the no parking designation is in effect.
         3) Post each street a minimum of 72 hours prior to the designation starting date.
         4) The Contractor is solely responsible for the installation and removal of no parking signage.
         5) Coordinate street posting with City staff.
      b. Equip signs with warning lights.
      c. Signs to remain in place until the sweeping of excess aggregate is complete.
   2. Flexible Raised Reflector Pavement Marking Devices:
      a. Provide new flexible raised reflector pavement marking devices to identify all existing pavement markings where applicable.
      b. Color to correspond to existing pavement marking.
      c. Install 5 days prior to seal coating at each specific location.
      d. Interval spacing: minimum 100 feet, or where changes occur in existing striping.
      e. Repainting of pavement markings will **not** be done under this Contract.
   3. Reroute traffic as necessary.
   4. All flag persons, barricades, flashers, and safety measures are the sole responsibility of the Contractor.
   5. Provide sufficient direction and warning signs on the Project to minimize inconvenience to property owners and the traveling public.
   6. Provide reasonable access at all times for abutting property owns and for emergency vehicles. Utilize flares or approved flashers from sunset to sunrise if required by construction.
   7. All traffic control costs will be considered incidental to the Project.

3.10 FIELD QUALITY CONTROL

A. Submit the following items at the preconstruction meeting for review by the Engineer:
   1. A report from an independent testing laboratory indicating the gradation, median aggregate size, flakiness index, bulk specific gravity, and loose unit weight of the aggregate being supplied for the Project. This information shall be used to determine the design application rates for the aggregate and asphaltic material.
   2. Information regarding the anticipated residual asphalt content of the proposed binder material.

B. Notify Engineer of pit location, asphaltic material supply, scale location, and any other correlated items in advance of starting time, so adequate control measures can be established.

END OF SECTION

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SECTION 32 13 14

CONCRETE WALKS, MEDIANS, AND DRIVEWAYS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete walkways, medians, driveways, and valley gutters.

B. Related Sections:
   1. Section 00 52 10 – Agreement
   2. Section 02 41 13 – Selective Site Demolition
   3. Section 31 23 00 – Excavation and Fill
   4. Section 31 23 13 – Subgrade Preparation
   5. Section 32 11 23 – Dense Graded Base
   6. Section 32 12 01 – Flexible Paving (Municipal Projects

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Concrete Sidewalk: Measurement shall be on the basis of in-place square yard, according to thickness of sidewalk:
      a. Payment of the Bid Item shall include the following:
         1) Concrete materials
         2) Subgrade and base preparation
         3) Placement of materials
         4) Labor and equipment
         5) Finishing
         6) Curing and protection
         7) Backfilling
      b. Excavation for concrete sidewalk shall be measured and compensated per Section 31 23 00.
      c. Dense graded base beneath concrete sidewalk shall be measured and compensated per Section 32 11 23.
   2. Remove and Replace Concrete Sidewalk: This Bid Item shall be used for all concrete sidewalk removed and replaced on this Project without regard to thickness and is assumed to be all hand placed. Measurement shall be on the basis of in-place square yard of sidewalk removed and replaced:
      a. Payment of the Bid Item shall include the following:
         1) Sawcutting at the removal limits
         2) Removal and disposal of existing concrete and excess aggregate materials per Section 02 41 13
         3) Excavation and subgrade preparation
         4) Dense graded base placement and preparation
         5) Concrete materials
         6) Placement of materials
         7) Labor and equipment
         8) Finishing
         9) Curing and protection

10) Backfilling

3. Concrete Pedestrian Curb Ramp: Measurement shall be on the basis of square feet of ramp actually constructed:
   a. Measurement of ramp shall not include adjacent concrete curb and gutter, which shall be measured and compensated separately.
   b. Payment shall include the following:
      1) Sawcutting and removal of existing asphalt trail pavement, and disposal of excess material off the Site.
      2) Dense graded base preparation.
      3) Concrete materials, including material under truncated dome.
      4) Placement of materials.
      5) Labor and equipment.
      6) Finishing.
      7) Curing and protection.
      8) Backfilling.
   c. Excavation for concrete pedestrian ramp shall be measured and compensated per Section 31 23 00.
   d. Dense graded base beneath concrete sidewalk shall be measured and compensated per Section 32 11 23.
4. Remove and Replace Concrete Pedestrian Curb Ramp:
   a. Measurement of ramp shall be the final finished square feet of concrete placed.
   b. Measurement of ramp shall not include adjacent concrete curb and gutter, which shall be measured and compensated separately.
   c. Payment shall include the following:
      1) Sawcutting and removal of existing concrete pedestrian ramp, existing concrete sidewalk, or existing asphalt trail required to achieve the final size and shape as directed by the Engineer.
      2) Removal and disposal of existing concrete and excess aggregate materials per Section 02 41 13.
      3) Excavation and subgrade preparation
      4) Dense graded base placement and preparation
      5) Concrete materials, including material under truncated dome
      6) Placement of materials
      7) Labor and equipment
      8) Finishing
      9) Curing and protection
      10) Backfilling
5. Curb Ramp Detectable Warning Field: Measurement shall be on the basis of square feet installed:
   a. Payment shall include the following:
      1) Materials
      2) Placement of panels
      3) Joint sealing material
      4) Protection of panels during construction
   b. Radial Truncated domes will be measured along the long cord and multiplied by 2 feet to compute square footage.
6. Concrete Driveway Apron 6-Inch (Residential), Concrete Driveway Apron 7-Inch (Alley or Commercial): Measurement shall be on the basis of in-place square yard:
   a. Payment of the Bid Item shall include the following:
      1) Excavation and subgrade preparation
      2) Dense graded base placement and preparation
      3) Concrete materials (high early)
      4) Placement of materials

5) Labor and equipment
6) Finishing
7) Curing and protection
8) Backfilling

b. Saw cutting at the removal limits and removal and disposal of existing concrete and aggregate materials will be measured and compensated per Section 02 41 13.

7. Remove and Replace Concrete Driveway Apron 6-Inch (Residential), Concrete Driveway Apron 7-Inch (Alley or Commercial): Measurement shall be on the basis of in-place square yard of Concrete Driveway Apron removed and replaced:
   a. Payment of the Bid Item shall include the following:
      1) Sawcutting at the removal limits
      2) Removal and disposal of existing concrete pavement and excess aggregate materials per Section 02 41 13
      3) Excavation and subgrade preparation
      4) Dense graded base placement and preparation
      5) Concrete materials (high early)
      6) Placement of materials
      7) Labor and equipment
      8) Finishing
      9) Curing and protection
      10) Backfilling
8. Concrete Median: Measurement shall be on the basis of in-place square yard, according to thickness of median:
   a. Payment of the Bid Item shall include the following:
      1) Excavation
      2) Dense graded base
      3) Concrete materials
      4) Subgrade and base preparation
      5) Placement of materials
      6) Labor and equipment
      7) Finishing
      8) Curing and protection
      9) Backfilling.
9. Remove and Replace Concrete Median: Measurement shall be on the basis of in-place square yard of median removed and replaced, regardless of thickness:
   a. Payment of the Bid Item shall include the following:
      1) Sawcutting at the removal limits
      2) Removal and disposal of existing concrete and excess aggregate materials per Section 02 41 13
      3) Excavation and subgrade preparation
      4) Dense graded base placement and preparation
      5) Concrete materials
      6) Placement of materials
      7) Labor and equipment
      8) Finishing
      9) Curing and protection
      10) Backfilling
10. Concrete Median Approach Nose: Measurement shall be on the basis of in-place square yard:
    a. Payment of the Bid Item shall include the following:
       1) Excavation
       2) Dense graded base
       3) Concrete materials
       4) Subgrade and base preparation

5) Placement of materials
6) Labor and equipment
7) Finishing
8) Curing and protection
9) Backfilling

11. Remove and Replace Concrete Median Approach Nose: Measurement shall be on the basis of in-place square yard of median approach nose removed and replaced:
    a. Payment of the Bid Item shall include the following:
        1) Sawcutting at the removal limits
        2) Removal and disposal of existing concrete and excess aggregate materials per Section 02 41 13
        3) Excavation and subgrade preparation
        4) Dense graded base placement and preparation
        5) Concrete materials
        6) Placement of materials
        7) Labor and equipment
        8) Finishing
        9) Curing and protection
        10) Backfilling
12. Concrete Valley Gutter: Measurement shall be on the basis of in-place square yard:
    a. Payment of the Bid Item shall include the following:
        1) Saw cutting of existing pavement
        2) Removal and disposal of existing asphalt and all excess materials per Section 02 41 13
        3) Excavation and subgrade preparation
        4) Dense graded base
        5) Concrete materials (high early)
        6) Subgrade and dense graded base preparation
        7) Placement of materials
        8) Labor and equipment
        9) Reinforcement
        10) Finishing
        11) Curing and protection
        12) Patching adjacent asphalt pavement per Section 32 12 01
13. Remove and Replace Concrete Valley Gutter: Measurement shall be on the basis of in-place square yard:
    a. Payment of the Bid Item shall include the following:
        1) Sawcutting of existing pavement
        2) Removal and disposal of existing concrete, asphalt, and excess aggregate materials per Section 02 41 13
        3) Excavation and subgrade preparation
        4) Dense graded base
        5) Concrete materials (high early)
        6) Subgrade and dense graded base preparation
        7) Placement of materials
        8) Labor and equipment
        9) Reinforcement
        10) Finishing
        11) Curing and protection
        12) Patch adjacent asphalt pavement per Section 32 12 01
14. High Capacity Concrete Apron: Measurement shall be on the basis of each:
    a. Payment of the Bid Item shall include the following:
        1) Dense graded base
        2) Concrete materials (6” thick)

3) Subgrade and dense graded base preparation
4) Placement of materials
5) Labor and equipment
6) Reinforcement
7) Finishing
8) Curing and protection
9) Backfilling

15. Concrete Spillway: Measurement will be by the square foot of spillway constructed:
    a. Payment of the Bid Item shall include the following:
        1) Excavation and subgrade preparation
        2) Removal and disposal of all excess materials per Section 02 41 13
        3) Dense graded base placement and preparation
        4) Concrete materials
        5) Placement of materials
        6) Labor and equipment
        7) Finishing
        8) Curing and protection
        9) Backfilling
16. Concrete Truck Apron: Measurement shall be on the basis of in-place square yard, according to thickness of apron:
    a. Payment of the Bid Item shall include the following:
        1) Concrete materials and tie bars
        2) Subgrade and base preparation
        3) Placement of materials
        4) Placement of tie bars at 36" spacing o.c. between the concrete pavement and any adjacent curb and gutter
        5) Finishing
        6) Curing and protection
        7) Backfilling
    b. Dense graded base beneath concrete pavement shall be measured and compensated per Section 32 11 23.
17. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WisDOT Spec.):
    1. 105 – Control of the Work
    2. 207 - Embankment
    3. 415 – Concrete Pavement
    4. 501 – Concrete
    5. 602 – Concrete Sidewalks, Loading Zones, Safety Islands and Steps
    6. 716 – QMP Ancillary Concrete

1.04 SUBMITTALS

A. Submit one (1) 7-day and two (2) 28-day concrete cylinder test results per concrete mix per day.

B. Submit WisDOT approved design mix for each concrete mix designation used. If a WisDOT approved mix design is unavailable, the Engineer will establish the job mix proportions.

1.05 SEQUENCING AND SCHEDULING

A. Prime Contractor is responsible for scheduling an onsite pre-pour meeting with the Owner, Engineer, Concrete Subcontractor (if appropriate), including the Concrete Forman a minimum 24 hours prior to the pouring operations.

B. Provide notice by 2:00 pm of the day prior to any concrete curb and placement to allow for scheduling of the following activities. Notice must include mix designation, start time of placement, plant producing concrete, and Forman onsite during placement:
   1. Dense graded base density tests (per Section 32 11 23) prior to any concrete curb being placed.
   2. Inspection of curbing operations by a City representative. No curbing will be allowed or accepted without inspection.
   3. Concrete field and plant testing if required.

C. Complete construction of concrete pedestrian ramps prior to the paving of asphalt path and construction of the concrete sidewalk.

D. Complete construction of concrete sidewalks following the paving of the asphalt lower lift and following the installation of Private Utilities.

E. Begin construction of the concrete driveway aprons no sooner than 24 hours after placement of the adjacent concrete curb and gutter with completion within 5 days of curb placement, or per applicable in Milestones per Section 00 52 10.

F. Construct concrete medians no sooner than 72 hours after placement of the concrete curb and gutter.

G. Construct concrete valley gutter after asphalt lower lift placement and prior to placement of asphalt upper lift:
   1. On street rehabilitation projects, Valley Gutters shall be constructed in halves to provide access for residents.

H. Complete the Patch Concrete Driveway to allow access to driveway within 7 calendar days, beginning on the day of the removals, or per applicable in Milestones per Section 00 52 10.

I. All concrete placed after October 1 must be high early strength concrete, unless otherwise approved by City Engineer.

J. Concrete placement will not be allowed after October 15, unless otherwise approved by City Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete to conform to WisDOT Spec. 501, except as modified herein:
   1. Portland Cement: Conform to WisDOT Spec. 501.2.1:
      a. Concrete shall be air-entrained.
   2. Air-Entraining Admixtures: conform to WisDOT Spec. 501.2.2:
      a. Not to be added to the concrete mixtures in the field without approval from Engineer.
   3. Mix Designation and Classification:
      a. Sidewalk, Driveways, Pedestrian Ramps, and Medians: Grade A.

b. Valley gutters: Must use high early strength.
c. 28-day compressive strength requirement: 4,500 psi.

B. Curb Ramp Detectable Warning Field: Approved products:
1. East Jordan Iron Works – Natural Patina
2. Neenah Foundry Company – Natural Patina

C. Joint Filler: Conform to WisDOT Spec. 415.2.3.

D. Curing Compound: Conform to WisDOT Spec. 415.2.4:
1. Curing compound shall contain a fugitive dye.

E. Sub-Grade Base Material:
1. Granular Backfill: Conform to Section 31 23 00.
2. Dense Graded Base: Conforming to Section 32 11 23.

F. High Early Concrete:
1. Conform to WisDOT 501.2, except as modified herein:
a. High early concrete shall be designed to provide a maximum water/cementitious ratio of 0.40.
b. High early concrete shall be designed to provide a minimum flexural strength of 500 psi and a minimum compressive strength of 3,000 psi in 48 hours.
c. Concrete valley gutter shall be constructed using high early concrete.
d. High early concrete may be included as a separate Bid Item or as an Engineer ordered material. In absence of a separate Bid Item for high early strength concrete, compensation will be at an agreed upon price not to exceed 20 percent above the Contract cubic yard price for standard strength concrete for the quantity ordered by the Engineer. The price shall be agreed upon prior to placement.

PART 3 EXECUTION

3.01 GENERAL

A. Provide copies of batch tickets for concrete mix at the time of material delivery to Site.

B. Construct concrete sidewalk, pedestrian ramps, driveways, medians, median approach noses, and valley gutters at the locations and elevations indicated on the Drawings.

C. Construct sidewalks and medians to conform to the typical section shown on the Drawings.

D. Construct concrete driveway aprons to conform to Standard Detail Plates STR-3, STR-4 and STR-5.

E. Construct concrete median approach nose per Standard Plate STR-33.

F. Construct concrete valley gutters to conform to Standard Detail Plate STR-11.

G. Construct High Capacity Concrete Apron to conform to Standard Detail Plate STR-34 and STR-35.

H. Construct concrete curb ramp to conform to WisDOT Standard Details, current version.

I. Verify locations with Engineer in the field prior to construction.

J. The completed concrete work shall give the appearance of uniformity in surface contour and texture, and shall be accurately constructed to line and grade. The required joints, edges, and flow lines shall show neat workmanship. The concrete work shall be in full accordance with the Standard Detail Drawings. Any deviations from the Standard Detailed Drawings may be cause for removal and replacement at the Contractor's expense. No price reductions will be allowed as a means to correct deviations.

K. Re-tempering of concrete which has partially hardened with or without additional materials or water is prohibited.

L. Remove and Replace Concrete Sidewalks, Concrete Pedestrian Ramps, Concrete Driveways, Concrete Medians, Concrete Median Approach Noses:
   1. Perform patching at locations shown on the Drawings or as directed by the Engineer per Standard Detail STR-12, STR-13 and STR-14.
   2. Remove existing concrete per Section 02 41 13.
   3. Saw cut existing concrete per Section 02 41 13.
   4. Excavate to the bottom of the dense graded base layer and dispose of the material per Section 31 23 00.
   5. Place dense graded base per Section 32 11 23.
   6. Place concrete pavement.

M. Construct Concrete Spillway:
   1. Construct a concrete spillway at locations shown on the Drawings or as directed by the Engineer.
   2. 6 inches thick (minimum).
   3. 5 feet wide (minimum).
   4. Construct spillway such that the storm water is conveyed directly to the bottom of the drainage way, thereby minimizing erosion in the general area.

N. Concrete washout locations shall conform to the requirements of the NPDES Permit.

3.02 FOUNDATION PREPARATIONS

A. Placement of the dense graded base or granular material to support the concrete work shall conform to Section 32 11 23 or Section 31 23 13. Compaction of subgrade base shall conform to WisDOT Spec. 207.3.6.3, Special Compaction.

B. The foundation shall be approved by the Engineer prior to placement of concrete material.

3.03 FORMS

A. Conform to WisDOT Spec. 602.3.2.2.

3.04 JOINT CONSTRUCTION

A. Conform to WisDOT Spec. 602.3.2.5, except as modified herein:
   1. Match joints of adjacent concrete work.
   2. Transverse expansion joints for sidewalk:
      a. Concrete areas that are poured separately.
   3. Contraction joints shall be sawed.

3.05 METAL REINFORCEMENT

A. Conform to WisDOT Spec. 602.3.2.4:
   1. Install 3 No. 4 steel reinforcing rods in lower portion of the valley gutter section with minimum 2-inches coverage on all sides.

3.06 PLACING AND FINISHING

A. Conform to WisDOT Spec. 602.3.2.3, except as modified herein:
   1. Any deviation in the design curvature of concrete edges in excess of 3/8 of an inch, measured with a 10-foot straight edge, will be considered unacceptable.
   2. Any surface area allowing the entrapment of water at a depth 1/8 inch or greater will be considered unacceptable.
   3. Unacceptable work shall be removed and replaced with acceptable Work as directed by the Engineer. Acceptance of Work by price reduction will not be allowed.

B. Curb Ramp Detectable Warning Field:
   1. Panels - Conform to the manufacturer's recommendations for placement.
   2. Panels shall be placed (wet set) on a minimum of 6-inches concrete and prior to finishing the adjacent concrete surface of the pedestrian ramp. The joint between the panel and concrete shall be finished with 1/2-inch radius edging tool.
   3. Conform to WisDOT Standard Detail Drawing 8D5-19f for specified surface pattern dimensions. Refer to the Drawings for actual ramp size, shape, and slopes.
   4. Multiple panels shall be rectangular or radial plates of equal size and shall be joined together per the manufacturer's recommendation.
   5. Joint space between panels shall be no greater than 1/4-inch in width.

3.07 CONCRETE CURING AND PROTECTION

A. Conform to WisDOT Spec. 415.3.12.1 and 415.3.12.2 (Impervious Coating Method), except as modified herein:
   1. Coat all surfaces with membrane curing compound within 30 minutes after finishing at the specified rate.
   2. The curing compound must contain a fugitive dye and be applied at 2 different directions perpendicular to each other to provide a uniform solid white opaque coverage (equal to a white sheet of typing paper) on all exposed concrete surfaces.
   3. A second application of membrane curing compound shall be applied 4 to 8 hours after the first application at the specified rate.
   4. Protect concrete against hot weather conditions as defined in the PCA Design and Control of Concrete Mixtures as when the rate of evaporation of bleed water per hour exceeds 0.2 lb. of water per square foot per hour. A chart published by the ACI and PCA can be used to predict the bleed water rate
   5. Cold weather curing, when temperatures fall below 40 degrees F during placement or within the following 24 hours, shall conform to WisDOT Spec. 415.3.15, except as modified below:
      a. If temperatures are projected to fall below 32 degrees within 24 hours of concrete placement, insulated blankets shall be using for curing.
      b. All costs associated with blanket curing shall be incurred by the Contractor.
   6. Failure to comply with these provisions will result in a price reduction for the concrete Bid Item involved in accordance with WisDOT Spec. 105.3.
   7. The freshly finished surface shall be protected, surfaces pitted by rain will be considered unacceptable.

8. The Contractor is responsible for protecting their work until final acceptance. Removal and replacement of any concrete section damaged by pedestrians, bicycles, automobile traffic, rain, cold weather, or other causes occurring prior to final acceptance shall be the responsibility of the Contractor.

3.08 BACKFILLING

A. Conform to WisDOT Spec. 602.3.2.7, except as modified herein,
   1. Backfill to protect the concrete no sooner than 72 hours after placement of the concrete.

3.09 FIELD QUALITY CONTROL

A. Any sidewalk, driveway, pedestrian ramp, etc. damaged by the Contractor shall be removed and replaced by the Contractor, and will be incidental to the Project.

B. Visual Inspection – Placement of any concrete panel with defects or damage caused during construction as noted below shall be removed and replaced by the Contractor, and will be incidental to the Project:
   1. Pop outs exceeding 7 occurrences per square yard.
   2. Mortar Flaking.
   3. Scaling.
   4. Any cracking not following contraction or expansion joints.
   5. Shrinkage cracking.

C. Conform to WisDOT Spec. 716.2.1, except as modified herein:
   1. 1 set of three compressive strength cylinders per mix, per placement method, per day.

D. The Owner may have an independent testing laboratory perform random QV testing. The test locations shall be determined by the Engineer:
   1. 1 air entrainment test per day, per Project (per concrete mix).
   2. 1 slump test per day, per Project (per concrete mix).
   3. 1 set of cylinders for compression tests per day, per Project (per concrete mix):
      a. An additional cylinder will be cast to be tested when concrete has reached maturity.

END OF SECTION

SECTION 32 16 13

CONCRETE CURBS AND GUTTERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete curb and gutter.

B. Related Sections:
   1. Section 00 52 10 – Agreement Form
   2. Section 02 41 13 – Selective Site Demolition
   3. Section 31 10 00 – Site Clearing
   4. Section 32 11 23 – Dense Graded Base
   5. Section 32 12 01 – Flexible Paving (Municipal Projects)
   6. Section 32 12 14 – Concrete Walks, Medians, and Driveways

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Concrete Curb and Gutter: Measurement shall be by the linear foot measured along the face of the curb at the gutter line for each type. Payment shall include materials, preparation, placement, finishing, curing, protection, reinforcement, and backfilling. Measurement shall not include frames/castings that are located along the face of curb.
   2. Remove and Replace Concrete Curb and Gutter: This Bid Item shall be used for all concrete curb and gutter removed and replaced on this Project without regard to type or size and is assumed to be all hand placed. Measurement will be per linear foot along the face of curb. Payment will include all costs, including labor, materials, and equipment necessary to complete the work, including sawcutting at the removal limits and disposal of the material per Section 02 41 13, stripping and offsite disposal of soil per Section 31 10 00, construction of new curb and gutter, and patching of adjacent street.
   3. No separate measurement or payment for modifications at driveways, pedestrian ramps, transition sections, or D24 curb installed at catch basins and radii.
   4. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. American Society of Testing Materials (ASTM):
   1. C260 - Air-Entraining Admixtures for Concrete

B. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 Edition (WisDOT Spec.):
   1. 415 – Concrete Pavement
   2. 501 – Concrete
   3. 601 – Concrete Curb and Gutter
   4. 716 – QMP Ancillary Concrete

1.04 SUBMITTALS

A. Submit one (1) 7-day and two (2) 28-day concrete cylinder test results per concrete mix per day.

B. Submit WisDOT approved design mix for each concrete mix designation used. If a WisDOT approved mix design is unavailable, the Engineer will establish the job mix proportions.

1.05 SEQUENCING AND SCHEDULING

A. Prime Contractor is responsible for scheduling an onsite pre-pour meeting with the Owner, Engineer, Concrete Subcontractor (if appropriate), including the Concrete Forman a minimum 24 hours prior to the pouring operations.

B. Provide notice by 2:00 pm of the day prior to any concrete curb and placement to allow for scheduling of the following activities. Notice must include mix designation, start time of placement, plant producing concrete, and Forman onsite during placement:
   1. Dense graded base density tests (per Section 32 11 23) prior to any concrete curb being placed.
   2. Inspection of curbing operations by a City representative, no curbing will be allowed or accepted without inspection.
   3. Concrete field and plant testing if required.

C. All temporary stockpiles located within the boulevard area or other areas behind the concrete curb and gutter must be removed prior to curb placement.

D. Concrete curb and gutter construction precedes installation of pavement.

E. Horizontal and vertical alignment established with "stringline" and or forms for concrete curb and gutter placement shall be approved by the Engineer prior to concrete placement. Notify the Engineer a minimum of 4 hours (one half day) prior to placement of concrete to allow for review and approval of "stringline" or forms.

F. All concrete placed after October 1 must be high early strength concrete, unless otherwise approved by City Engineer.

G. Concrete placement will not be allowed after October 15, unless otherwise approved by City Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete to Conform to WisDOT Spec. 501, except as modified herein:
   1. Portland Cement: Conform to WisDOT Spec. 501.2:
      a. Concrete shall be air-entrained.
   2. Air-Entraining Admixtures: Conform to WisDOT Spec. 501.2.2:
      a. Not to be added to the concrete mixtures in the field without approval from Engineer.
   3. Mix Designation and Classification for Concrete Curb and Gutter:
      a. Manual Placement: Grade A.
      b. Slip Form Placement: Grade A or A-S2.
      c. 28-day compressive strength requirement: 4,500 psi.

B. High Early Strength Concrete
   1. Conform to WisDOT Spec. 501.2, except as modified herein:
      a. High early concrete shall be designed to provide a maximum water/cementitous ratio of 0.40.
      b. High early concrete shall be designed to provide a minimum flexural strength of 500 psi and a minimum compressive strength of 3,000 psi in 48 hours.
      c. High early concrete may be included as a separate Bid Item or as an Engineer ordered material. In absence of a separate Bid Item for high early strength concrete, compensation will be at an agreed upon price not to exceed 20 percent above the Contract cubic yard price for standard strength concrete for the quantity ordered by the Engineer. The price shall be agreed upon prior to placement.

C. Joint Filler: Conform to WisDOT Spec. 415.2.3.

D. Curing Compound: Conform to WisDOT Spec. 415.2.4:
   1. Curing compound shall contain a fugitive dye.

PART 3 EXECUTION

3.01 GENERAL

A. Provide copies of batch tickets for concrete mix at the time of material delivery to the Site.

B. Construct concrete curb and gutter at the locations and elevations indicated on the Drawings. Any concrete curb and gutter that is longer than 200 linear feet continuously, shall be placed using slip form placement.

C. Construct the style or type of curb and gutter as shown on the Drawings.

D. Construct intersection curb radii and transitions sections to conform to the detail on the Drawings.

E. Construct transition sections at inlet structures to conform to the detail on the Drawings.

F. Construct concrete curb ramp depressions to conform to the detail on the Drawings.

G. Construct curb transitions for driveways to conform to the detail on the Drawings. Locations to be verified by Engineer at the time of construction.

H. The completed concrete work shall give the appearance of uniformity in surface contour and texture, and shall be accurately constructed to line and grade. The required joints, edges, and flow lines shall show neat workmanship. The concrete curb shall be in full accordance with the Standard Detail Drawings. Any deviations from the Standard Detailed Drawings may be cause for removal and replacement at the Contractor's expense. No price reduction will be allowed as a means to correct the deviations.

I. Re-tempering of the concrete which has partially hardened with or without additional materials or water is prohibited.

J. Concrete curb and gutter damaged by the Contractor during construction operations shall be removed and replaced in accordance to the City's Standard Detail Drawings and requirements.

K. Concrete washout locations shall conform to the requirements of the NPDES.

3.02 FOUNDATION PREPARATIONS

A. Support on a compacted dense graded base extending 1 foot behind the back of curb:
   1. Conform to typical sections as shown on the Drawings.
   2. Conform to Section 32 11 23 and WisDOT Spec. 301.3.4.3.

3.03 FORMS

A. Conform to WisDOT Spec. 601.3.3.

3.04 JOINT CONSTRUCTION

A. Conform to WisDOT Spec. 601.3, except as modified herein:
   1. Contraction joints: 10-foot intervals.
   2. Transverse expansion joints:
      a. 10' from inlet
      b. 300' intervals
      c. Adjacent to hand placed curb
   3. Contraction joints shall be formed.

3.05 METAL REINFORCEMENT

A. Conform to WisDOT Spec. 415.2.2:
   1. Metal reinforcement not required 10' on each side of catch basins or service trenches.

3.06 PLACING AND FINISHING

A. Conform to WisDOT Spec. 601.3.4 and 601.3.5, except as modified herein:
   1. The top surface of the curb and gutter shall have a brush finish at right angles to the curb line.

3.07 CONCRETE CURING AND PROTECTION

A. Conform to WisDOT Spec. 415.3.12.1 and 415.3.12.2 (Impervious Coating Method), except as modified herein:
   1. Coat all surfaces with membrane curing compound within 30 minutes of concrete placement unless otherwise directed by Engineer.
   2. The curing compound must be applied in 2 different directions perpendicular to each other to provide a uniform solid white opaque coverage (equal to a white sheet of typing paper) on all exposed concrete surfaces.
   3. A second application of membrane curing compound shall be applied 4 to 8 hours after the first application at the specified rate.
   4. Protect concrete against hot weather conditions as defined in the PCA Design and Control of Concrete Mixtures as when the rate of evaporation of bleed water per hour exceeds 0.2 lb. of water per square foot per hour. A chart published by the ACI and PCA can be used to predict the bleed water rate.
   5. Cold weather curing, when temperatures fall below 40 degrees during placement or within the following 24 hours, shall conform to WisDOT Spec. 415.3.15, except as modified below:
      a. If temperatures are projected to fall below 32 degrees within 24 hours of concrete placement, insulated blankets shall be using for curing.
      b. All costs associated with blanket curing shall be incurred by the Contractor.
   6. Failure to comply with these provisions will result in a price reduction for the concrete curb and gutter Bid Item involved in accordance with WisDOT Spec. 105.3.

7. The freshly finished surface shall be protected. Surfaces pitted by rain will be considered unacceptable.
8. The Contractor is responsible for protecting their work until final acceptance. Removal and replacement of any curb section damaged by pedestrians, bicycles, automobile traffic, rain, cold weather, or other causes occurring prior to final acceptance shall be the responsibility of the Contractor.

3.08 BACKFILLING

A. Initial Backfilling:
   a. Follow the 72-hours curing period with completion within 6 days of original placement, or per applicable in Milestones per Section 00 52 10.
   b. Must be flush with top of curb elevation.

B. Final Grading:
   a. Following completion of private utility work by others.

C. Curb damaged during backfilling is the responsibility of the Contractor.

3.09 WORKMANSHIP AND FINISH

A. Conform to WisDOT Spec. 601.3, except as modified herein:
   1. Any deviation in the design curvature of concrete edges in excess of 3/8 of an inch, measured with a 10-foot straight edge, will be considered unacceptable.
   2. Acceptance of Work by price reduction will not be allowed.

3.10 FIELD QUALITY CONTROL

A. Any curb damaged by the Contractor shall be removed and replaced by the Contractor, and will be incidental to the Project.

B. Visual Inspection – Placement of any concrete panel with defects or damage caused during construction as noted below shall be removed and replaced by the Contractor, and will be incidental to the Project:
   1. Popouts exceeding 7 occurrences per square yard
   2. Mortar Flaking
   3. Scaling
   4. Any cracking not following contraction or expansion joints
   5. Shrinkage cracking

C. Conform to WisDOT Spec. 716.2.1, except as modified herein:
   1. 1 set of three compressive strength cylinders per mix, per placement method, per day.

D. The Owner may have an independent testing laboratory perform random QV testing. The test locations shall be determined by the Engineer:
   1. 1 air entrainment test per day, per Project (per concrete mix).
   2. 1 slump test per day, per Project (per concrete mix).
   3. 1 set of cylinders for compression tests per day, per Project (per concrete mix):
      a. An additional cylinder will be cast to be tested when concrete has reached maturity.

END OF SECTION

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SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Pavement markings for control and guidance of traffic.

B. Related Sections:
   1. Section 01 33 00 - Submittal Procedures
   2. Section 02 41 13 – Selective Site Demolition

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Lines:
      a. Lines shall be measured by the linear foot on the basis of length actually applied, regardless of color:
         1) Separate measurement will be made on the basis of type and nominal width.
         2) Double lines shall be measured to include both lines per linear feet of quantity because they are applied simultaneously.
         3) Broken, dotted, dashed lines: measurement will only include the painted length.
         4) Ladder Pattern (for crosswalk): measurement will be square feet of paint applied.
   2. Messages:
      a. Messages shall be measured on the basis of each applied, according to type (i.e. word, arrow, symbol, etc.).
   3. Payment of each Bid Item shall be compensation in full for all costs incidental thereto, including but not limited to surface preparation, traffic control measures, maintaining the Work, removal of temporary pavement markers, together with any other expenses incurred in completing the Work that are not specifically included for payment under the Contract Bid Items.
   4. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition including all current supplements (WisDOT).
   a. Section 646

B. Wisconsin Department of Transportation Facilities Development Manual.

C. Wisconsin Manual on Uniform Traffic Control Devices (MUTCD), latest edition.

1.04 SUBMITTALS

A. Submit the following consistent with Section 01 33 00:
   1. Conform to WisDOT Section 646.2.
   2. 1 copy of the chosen epoxy lot or batch formulation.

3. Pavement Marking Contractor Qualifications/Certifications.

1.05 SEQUENCING AND SCHEDULING

A. Complete application of pavement markings within 7 calendar days of placement of the pavement to which the markings are to be applied.

PART 2 PRODUCTS

2.01 MATERIALS

A. Epoxy:
   1. Conform to WisDOT Section 646.2.4
   2. Furnish paint from WisDOT's Approved Products List

B. Glass Beads:
   1. Conform to WisDOT Section 646.2.3

2.02 EQUIPMENT

A. General: All equipment shall conform to the applicable requirements of WisDOT Section 646.3.2:
   1. Vehicles used shall be deployed and equipped with traffic control devices set forth in the "Wisconsin Manual on Uniform Traffic Control Devices."
   2. Shadow vehicle with truck-mounted attenuator shall be used on streets with posted speed equal to or greater than 40 m.p.h. or ADT greater than 1,500 vehicles per day.
   3. Equipment used for spray applications shall be capable of applying glass beads by a pressurized system at a rate of at least 25 lbs/gal.
   4. Capable of accumulating footage applied per gun.
   5. Stainless steel components in the delivery system required for water-based materials.

PART 3 EXECUTION

3.01 GENERAL

A. Conform to WisDOT Section 646.3

B. Notify Engineer at least 48 hours prior to commencing work, so spotting of pavement marking locations can be completed.

C. The pavement marking crew shall include at least 1 technical expert knowledgeable in each of the following areas:
   1. Equipment operation.
   2. Application techniques.
   3. Traffic control.
   4. Safety regulations.

D. The filling of tanks, pouring of materials, or cleaning of equipment shall not be performed on unprotected pavement surfaces, unless adequate provisions are made to prevent spillage of material.

E. All preparation shall conform to WisDOT Section 646.3.3.

3.02 SCHEDULE

A. Prime Contractor is responsible for scheduling an onsite pre-signing meeting with the Owner, Engineer, and Marking Subcontractor (if appropriate) a minimum of 24 hours prior to the installation of any pavement markings.

B. Permanent Epoxy Markings:
   1. Place following completion of the final asphalt course:
      a. No sooner than 24 hours after placement of asphalt.
      b. Within 7 calendar days of completion of asphalt placement, or per manufacturer recommendations on WisDOT's approved products list.

C. Temporary Pavement Markings:
   1. Temporary markings can be placed immediately after paving and allowing pavement surface to cool.

3.03 PREPARATION

A. Locations:
   1. In general accordance with the Drawings:
      a. Location of marking designating no passing zones to be coordinated with corresponding traffic signs.
   2. The Engineer will place necessary "Spotting" at appropriate points:
      a. Horizontal control.
      b. Starting and stopping points.
      c. Broken line intervals will not be marked.
      d. Longitudinal joints, pavement edges, and existing markings shall serve as horizontal control when so directed.
      e. Notify Engineer at least 48 hours in advance when requesting spotting locations.
   3. Edge lines and lane lines are to be broken only at intersections with public roads and at private entrances if they are controlled by a yield sign, stop sign, or traffic signal.
   4. The break point is to be at the start of the radius for the intersection or at marked stop lines or crosswalks.

B. Street Surface:
   1. Engineer may direct cleaning of surface as necessary immediately prior to marking application:
      a. Brushing with non-metallic rotary broom.
      b. Other cleaning method approved by Engineer.
      c. Air blast following cleaning.
   2. Surface must be dry.
   3. Minimum surface temperature is 50 degrees F.

C. Traffic Control:
   1. Conform to Wisconsin MUTCD
   2. Shadow vehicle with truck-mounted attenuator shall be used on streets with posted speed equal to or greater than 40 m.p.h. or ADT greater than 1,500 vehicles per day.

3.04 APPLICATION

A. General: Conform to WisDOT Spec. 646.3 and the following:
   1. Tolerance:
      a. Width: A tolerance of 1/4 inch under or 1/4 inch over the specified width will be allowed for striping provided the variation is gradual and does not detract from the general appearance.
      b. Length: Broken line segments may vary up to 2-3/4 inches from the specified lengths provided the over and under variations are reasonably compensatory.
      c. Alignment: Deviations from the control guide shall not exceed 2 inches.
      d. Establishment of application tolerances shall not relieve the Contractor of his responsibility to comply as closely as practicable with the planned dimensions.
   2. Material shall not be applied over longitudinal joints.
   3. 4-inch broken line consists of 10 feet of paint and 40 feet space (1 cycle).
   4. 4-inch dotted line consists of 3 feet of paint and 12 feet of space (1 cycle)
   5. If same equipment used for different color material with change in color, an amount of material equal to fifteen 10-foot long stripes shall be wasted prior to beginning application with the new color.
   6. Conditions:
      a. Markings shall not be applied when wind or other conditions cause a film of dust to be deposited on the pavement surface after cleaning and before the marking material can be applied.
      b. Except when used as a temporary marking, pavement markings shall only be applied in seasonable weather when air temperature is 50 degrees F or higher.

B. Glass Beads:
   1. Shall be applied immediately after application of epoxy markings.
   2. Rate of application shall be 8 lbs. per gallon.

3.05 CORRECTION OF DEFECTS

A. All pavement markings not conforming to the requirements of the Specifications shall be removed and replaced, or otherwise repaired to the satisfaction of the Engineer.

B. Where yield computations show a deficiency in material usage of not more than 20 percent, Owner may require satisfactory repair or may accept the Work at a reduced Bid Unit Price that is in direct proportion to the percent of the deficiency.

C. Where yield computations show a deficiency in material usage in excess of 20 percent, Owner will require removal and replacement to the satisfaction of the Engineer, unless other means are approved by the Engineer.

D. If removal and replacement is required, at least 90 percent of the deficient line shall be removed:
   1. Width of removal shall be 1 inch wider on all sides than the nominal width of the marking to be removed.
   2. Remove marking per Section 02 41 13.

E. Removal of unacceptable Work shall be accomplished with sand or water blasting equipment, unless other means are authorized by the Engineer. Street surfacing shall not be damaged by the removal operation.

END OF SECTION

SECTION 32 92 00

TURF AND GRASSES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental to turf restoration as indicated on the drawings or as specified herein.
2. A variety of different seeding mixtures may be utilized on this project. The Contractor shall refer to the plan for the locations of the different turf establishment areas.
3. Temporary seeding may be necessary during construction in erosion sensitive areas. The Contractor shall do temporary seeding work as specified herein or as directed by the Engineer.

B. Related Sections:
1. Section 01 33 00 - Submittal Procedures.
2. Section 01 57 13 - Temporary Erosion and Sediment Control.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. All the items in this Section shall follow the below payment schedule:
   a. Contractor shall be paid 50 percent of contract unit price upon installation of Bid Items included within this Section.
   b. Contractor shall be paid remaining contract unit price after proper maintenance and acceptance of the vegetative cover.
2. Seeding: Measurement will be based upon pounds of seed placed as specified, according to type of seed mixture. Payment will include soil amendments, furnishing and installing seed, preparation of surface, and all incidental items associated with the work.
3. Sod: Measurement will be based upon units of square yards of sod installed complete in place as specified, including soil amendments, furnishing and installing sod, preparation of surface, and all incidental items associated with the work.
4. Mulch: Measurement will be based upon units of acres, according to type, complete in place as specified. Payment will include preparation of seedbed, fertilizer, furnishing and installing mulch including disk anchoring, and all correlated activity.
5. Erosion Mat: Measurement will be based upon units of square yards of area restored, according to the type of mat installed. Payment will include all costs related to furnishing and placing fertilizer, mat, and all correlated activity.
6. Soil Stabilizer: Measurement will be by the square yard of area restored, according to type of soil stabilizer. Payment shall include the costs for furnishing and placing fertilizer, soil stabilizer, and all correlated activity.
7. Topsoil Borrow: Measurement will be per cubic yard (loose volume) of material hauled to the Site. Payment will include all costs related to furnishing the topsoil:
   a. All costs related to placing, shaping, and compacting the topsoil at locations shown on the Drawings or as directed by the Engineer shall be incidental to the Boulevard Grading Bid Item. Where a Bid Item is not provided for Boulevard Grading, all costs are considered incidental to the various Seeding or Sod Bid Items.
8. Furnishing and installation of items to secure required restoration materials, including staples for sod or erosion mat, shall be considered included in the Bid Item for that particular item.

9. All costs related to sweeping and cleaning any pavement, driveways, trails, sidewalks, etc. that are impacted by restoration activities shall be considered incidental to the restoration Bid Items. No payment will be made under the Street Sweeper With Operator and Skidsteer (Bobcat) With Operator Bid Items for this work.
10. Maintenance (i.e. weed control, watering, etc.) of newly seeded and sodded areas shall be included in the Bid Item for that particular item. No separate measurement and payment will be made for this work.
11. Measurement of restored areas shall be on the area actually covered. No additional compensation will be made for overlapping of restoration materials, such as erosion mat.
12. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition including all current supplements (WisDOT):
   1. WisDOT 625 – Topsoil and Salvaged Topsoil
   2. WisDOT 627 – Mulching
   3. WisDOT 628 – Erosion Control
   4. WisDOT 629 – Fertilizer
   5. WisDOT 630 – Seeding
   6. WisDOT 631 – Sodding
   7. Unless noted otherwise, the provisions in this section are in addition to the referenced specification.

1.04 SUBMITTALS

A. Provide the following submittals consistent with Section 01 33 00:
   1. Provide source and invoice for seed to be used for this Project.
   2. Producer's certificate of compliance – Written documentation verifying compliance of mixture of seed furnished. Include percentage of various seed species, year of production, germination rate, seed bag tags, and weed seed content. Submit to the Engineer at least 5 days prior to delivery.
   3. Provide Engineer with seed bag tags used for identification purposes.
   4. Provide documentation for tests of topsoil, and submit this information at the preconstruction meeting.

1.05 PLANT ESTABLISHMENT PERIOD

A. The Establishment Period for plants shall begin for immediately after installation, with the approval of the Engineer, and continue until the date that the Engineer performs a final inspection:
   1. The establishment period for sod is 30 days.
   2. The establishment period for seeded areas is 45 calendar days.
   3. The germination period for seed is 14 calendar days.

PART 2 PRODUCTS

2.01 TOPSOIL BORROW

A. Unless otherwise indicated on the plans, imported topsoil borrow for general use as a turf growing medium shall comply with WisDOT 625.2.

B. Unless otherwise indicated on the plans, imported topsoil borrow for use as a plant growing medium in designated areas such as landscape beds shall meet the requirements of 625.2

2.02 FERTILIZER

A. Provide slow release fertilizer with the following characteristics:
   1. Provide plant fertilizer that conforms to WisDOT Spec. 629.2.1.1.
   2. Specifically processed to release nitrogen at a slow rate over a growing season.
   3. Contains 10 percent nitrogen by weight, 10 percent of phosphorous by weight, and 10 percent of potassium by weight.
   4. The primary nitrogen sources shall be in a coated, prilled urea form.
   5. At least 70 percent of the nitrogen component shall be slow-release water-insoluble nitrogen.

2.03 SOD

A. Unless otherwise indicated on the plans, sod shall be Lawn Sod as defined in the referenced specification except when located within WisDOT right-of-way where Salt Tolerant Sod shall be utilized.

2.04 SEED

A. The seed mixture to be used shall be General Use Mixture No. 30 conforming to WisDOT Spec 630.2.1.5.

B. Unless otherwise specified on the plans, all application rates for WisDOT mixes, except temporary seed, are 150 percent the specified rate.

C. Type 1 mulch shall consist of clean straw with no pasture hay.

D. All seed shall be supplied as pure-live seed (PLS)

E. All seed and seed mixes shall conform to State seed requirements for noxious weed content.

F. All seed and seed mixes shall conform to State labeling requirements. For all species in the mix, the label and or invoice shall include the county of origin, and if from Canada, the province.

2.05 MULCH

A. Mulch shall conform to WisDOT Spec 627.3.2.2, Method B, Tackifier.

2.06 SOIL STABILIZER

A. Soil Stabilizer shall conform to WisDOT Spec. 628.3.12.2, Type A

2.07 EROSION MAT

A. Conform to section 01 57 13.

PART 3 EXECUTION

3.01 EXAMINATION

A. Review restoration areas with the Engineer. Determine locations for seed or sod. Schedule for restoration of areas may be revised to fit field conditions:
   1. No compensation will be allowed for areas considered to be needlessly restored if restoration activities are performed without the authorization of the Engineer.

B. Notify the Engineer at least 3 days in advance of hauling topsoil borrow on Site so the Engineer may visually inspect and sample for testing if deemed necessary.

C. Finish grades are to be inspected and approved by the Engineer prior to start of restoration.

3.02 DELIVERY AND STORAGE

A. Delivery:
   1. Notify the Engineer of the delivery schedule in advance so the plant material may be inspected upon arrival at the Site. Remove unacceptable plant material from the Site immediately.
   2. Deliver fertilizer to the Site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name or trademark, and in conformance to state and federal law. In lieu of containers, fertilizer may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.
   3. During Delivery: Protect sod from drying out and seed from contamination.

B. Storage:
   1. Sprinkle sod with water and cover with moist burlap, straw, or other approved covering, and protect from exposure to wind and direct sunlight. Covering should permit air circulation to alleviate heat development.
   2. Keep seed and fertilizer in dry storage away from contaminants.

3.03 PREPARATION

A. Shape the subgrade to the approximate contour of the finished surface. All construction debris shall be removed from the area prior to the placement of the topsoil. The subgrade shall be loosened with a disc or harrow to a depth of six-inches prior to application of the topsoil.

B. Shape the topsoil to the approximate contour of the finished surface, with a minimum depth of 4-inches, unless otherwise shown on the plan. All construction debris, rocks and trash shall be removed from the area prior to seeding or sodding. The topsoil shall be loosened with a disc or harrow to its full depth prior to seeding or sodding.

C. The Contractor shall be responsible for providing water and maintenance for a period of 30 calendar days, or until final acceptance by the Engineer or Owner, to firmly establish the seed or sod. The term maintenance shall include mowing, weed control and watering, as necessary. Failure to perform this work within 24 hours of notification of non-compliance may result in the Owner or Engineer arranging for completion of the work by others. A contract deduction shall be made equal to the total of all costs to perform such work so arranged, including but not limited to, labor, materials, equipment and administrative costs.

D. Where dormant seeding or sodding is authorized by the Engineer the maintenance period shall be extended to include the first 30 calendar days after the beginning of the growing season. The beginning of growing season shall be defined as bud burst.

3.04 TOPSOIL BORROW

A. Subgrade to be inspected and approved by Engineer prior to placement of topsoil borrow.

B. 4-inch minimum compacted thickness.

3.05 SOWING SEED

A. Turf establishment by seeding shall be done utilizing the various combinations of seed mixtures (including aquatic plants), fertilizing and mulching at disturbed areas as shown on the plans.

B. Areas prepared for seeding shall be free of rocks, debris and clumps of soil. The areas shall be graded uniformly and vegetated areas shall be raked free of chunks exceeding ½ inch diameter.

C. Seed shall be applied with a drill seeder, unless otherwise approved in writing by the Engineer.

D. The Contractor shall furnish weight tickets documenting pounds of soil stabilizer placed, pounds of fertilizer placed, and pounds of seed placed. The seed tickets shall show individual plant species along with the percent purity and percent germination. The fertilizer tickets shall show mix proportions. The Contractor shall also furnish its QA/QC data to the Engineer.

E. Final acceptance of seeding shall be based on an established growth of 6-inches with a uniform density to cover 90% of the designated area, free of weeds and bare spots. Any re-seeding necessary shall be performed at the Contractor's expense.

F. Prior to placing soil stabilizers:
   1. Install seed prior to soil stabilizer using a "brillian type" seeder to evenly spread seed over the entire Site.
   2. The Site shall be harrowed or raked parallel to the slope contours following seeding.
   3. The Site shall be packed using a culti-packer or equivalent, following harrowing.
   4. Apply fertilizer.

3.06 PLACING SOD

A. Place, shape, and compact 4 inches of topsoil prior to placement of sod.

3.07 MULCH: Conform to Section 01 57 13.

3.08 SOIL STABILIZER

A. Conform to WisDOT Spec. 628.3.12.2, Type A, except as modified below:
   1. Raking or harrowing of soil/seed and slope (cat) tracking shall be done before installation of hydraulic matrix.
   2. Apply hydraulic matrix in at least 2 opposing directions so that a shadowing effect leaving the back side of a soil clod unprotected is minimized.
   3. Apply hydraulic matrix immediately following seeding.

3.09 EROSION MAT

A. Conform to section 01 57 13.

3.10 SWEEPING AND CLEANUP

A. Immediately following the topsoil, seed, and sod placement, sweep and clean all pavement, driveways, trails and sidewalks impacted by these operations:
   1. Final clean up of the asphalt surface with the use of a power pickup broom and front-end loader/skidsteer.
   2. Street sweeping operations must include the application of water to effectively remove fine materials from pavement areas. The appropriate amount of water shall be applied, eliminating dust as part of the sweeping operations.
   3. Respond within 24 hours of a request by the Engineer, with the necessary street sweeping equipment to perform the cleanup operations.

3.11 MAINTENANCE

A. Restored areas that have been satisfactorily completed and are disturbed by additional construction activity required by the timing and sequencing of the Work shall be restored over to the same requirements of the original work.

B. Any sod that does not show definite growth and establishment 30 days after installation shall be replaced and established at the proper season by the Contractor at their expense.

C. Water the seeded areas to ensure establishment.

D. Weed control shall be the responsibility of the contractor during the establishment period. Weed control may include spot spraying and mowing to control weed growth.

E. Seeded areas that do not show seed germination 14 days after installation shall be replaced at the proper season by the Contractor at their expense and watering will be required every day at a minimum.

F. Seeded areas that do not show definite growth and establishment 45 days after installation shall be replaced and established at the proper season by the Contractor at their expense.

G. Watering of sod areas shall be done for a minimum period of 30 days from installation sufficient to ensure establishment of permanent vegetation:
   1. At the end of the 30-day maintenance period, Engineer will make an inspection of all restored areas. Engineer may direct Contractor to continue watering of any area if deemed necessary. Frequency of watering shall be as directed and modified by the Engineer. Duration of watering shall continue at the directed frequency until Contractor is directed by Engineer to cease.

3.12 FIELD QUALITY CONTROL

A. TOPSOIL BORROW:
   1. Source testing:
      a. The Contractor shall split and test a sample from prospective source with the Owner prior to the preconstruction meeting.
      b. The Contractor's QC sample and Owner's QA sample shall meet the requirements of section 2.01A. If the requirements are not met the Contractor must provide material from another source.
   2. Placement testing:
      a. The Contractor shall split and test a sample onsite at the time of placement with the Owner.

b. The Contractor's QC sample and Owner's QA sample shall meet the requirements of section 2.01A. If the requirements are not met the material will be rejected. The Contractor is responsible for all costs associated with additional testing due to failing materials.

3.13 INSPECTION AND ACCEPTANCE

A. Seeding and turf work will be inspected for acceptance in parts agreeable to the Engineer, provided Work offered for inspection is complete, including maintenance for the portion in question.

B. Seeded areas will be inspected for germination and growth 14 days after placement. Any restored areas that do not show definite germination and growth, as determined by the Engineer, shall be replaced and re-established by the Contractor at their expense.

C. At the conclusion of the establishment period(s), a final inspection of planting(s) will be made to determine the conditions of areas specified for landscaping.

D. When inspected landscape work does not comply with requirements, replace rejected Work and continue specified maintenance until re-inspected by Engineer and found to be acceptable. Remove rejected materials from the Site.

E. Seed evaluation at the conclusion of the establishment period related to acceptance, shall be based on at least 1 species per square foot with 90 percent of seeding per square foot being of the permanent seed species within the applied mix.

F. Boulevard settlements that occur during the correction period and are greater than 1 inch as measured by a 10-foot straight edge will be repaired in a manner acceptable to the Owner at the Contractor's expense.

END OF SECTION

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SECTION 32 93 00

TREES, SHRUBS, PERENNIALS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. This section covers the furnishing of all labor, materials, tools, equipment and performance of all work and services necessary or incidental to plant installation as indicated on the drawings or as specified herein.

B. Related Sections:
   1. American National Standards Institute (ANSI)
      a. ANSI Z60.1 – American Standard for Nursery Stock.
   2. Unless noted otherwise, the provisions in this section are in addition to the referenced specification.

1.02 PRICE AND PAYMENT PROCEDURES:

A. Measurement and Payment:
   1. Measurement and compensation for the following items shall be paid according to the referenced specification or as modified below:
      a. Trees: Measurement will be by each tree species, variety, and caliper and/or size range furnished and planted in accordance with the Drawings. Payment shall include:
         1) Excavation for tree planting hole.
         2) Furnishing and Planting of tree.
         3) Furnishing and installing accessories.
         4) Maintenance and watering, including furnishing and installing slow release watering bag.
      b. Shrubs: Measurement will be by each shrub species, variety, and size range furnished and planted in accordance with the Drawings. Payment shall include:
         1) Excavation for planting hole.
         2) Furnishing and Planting of shrub.
         3) Furnishing and placing mulch.
      c. Perennials: Measurement will be by each perennial species, variety, and size range furnished and planted in accordance with the Drawings. Payment shall include:
         1) Excavation for planting hole.
         2) Furnishing and Planting of perennial.
         3) Furnishing and placing mulch.
      d. Transplant Tree: Measurement will be per each tree, regardless of size or type. Payment will include salvaging the tree, temporarily storing the tree during construction, and re-planting the tree as specified in the same general location and as directed by the Engineer.
   2. All other work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Roadway and Structure Construction", 2019 (WisDOT Spec.):
   1. 629 – Fertilizer and Agricultural Limestone
   2. 632 – Furnishing and Planting Plant Materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Nursery Stock:
   1. Plant materials shall conform to the requirements of WisDOT Specification 632.
   2. No substitutions will be accepted without written approval from the Owner or Engineer.

B. Fertilizer: Conform to WisDOT Spec.629, with the modifications in WisDOT 632.2.4.

C. Mulch: Conform to WisDOT Spec. 632.2.6, or as modified below:
   1. Shredded hardwood mulch shall be provided free of dirt, ashes, sawdust, rocks, leaves, roots, black bark mold or any other debris.

D. Soil moisture Amendment Pellets: Soil Moist Professional Granular by JRM Chemical, Inc. or approved equal.

E. Slow Release Watering Bag: Treegator® Original or approved equal.

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Planting operations shall not be started, nor shall any planting stock be delivered to the Project site, until all other work has been completed in the area of the proposed planting site as determined by the Engineer.

B. Notify the Engineer orally or in writing, as designated by the Engineer, at least twenty four (24) hours prior to the start of any planting operations during this Contract, including layout staking, clearing, weed spraying, soil preparation, watering, mulching, plant protection, weeding and clean-up.

C. All planting operations shall be performed during normal working hours and under conditions suitable for such work, as determined by the Engineer, unless otherwise authorized by the Engineer.

D. The Engineer and City Parks Department will field stake the location of trees to be planted. All other plantings shall be staked by the contractor then reviewed and accepted by the City prior to installation.

E. Establish final grade prior to planting trees.

F. Tree Planting:
   1. Install trees per Standard Detail STR-36.

G. Mulching:
   1. Place a layer of mulch 2”-4” thick extending 1”-2” past the outside of the planting hole.
   2. Leave 2”-3” of space between the root flare and mulch.
   3. The outside boundary of the mulch ring should be raised slightly to help retain water.

H. Staking:
   1. Staked only as needed and directed by the Engineer.
   2. Stake when the root ball moves easily while the top of the tree is being moved back and forth or when the top cannot support itself and is bending.
   3. Materials directly connecting to the tree should have a broad smooth surface.
   4. Place stakes 6” inside the mulched area directly across from each other.
   5. Wire or rope used to connect the stake to the tree should be loose enough to allow the tree to move slightly in all directions.
   6. Stake the tree as low as possible, but not higher the 2/3 the height of the tree.

I. Soil Moisture Amendment:
   1. Apply per manufactures recommendations.
   2. This item shall be considered incidental to the respective planting.

J. Shrub and Perennial Planting:
   1. Excavate planting hole to a width of 2 times the container size.
   2. Excavate planting hole to the depth of the container.
   3. Furnish and install specified plant.
   4. Backfill with soil from the original planting hole. Respread any excess excavated material.
   5. Place mulch 3” thick, unless otherwise specified on the drawings.

K. The Plant Establishment Period shall be 2 years, and shall begin upon written approval of the work by the Engineer. Replacement of dead or defective trees or incidental materials shall be required immediately or as soon as is practicable within an appropriate period of time as ordered by the Owner or Engineer. It is anticipated that the plant establishment will be included in the specified warrantee period and that no retainage will be held throughout the plant establishment period unless the Owner or Engineer determine that the materials or procedures warrant such a retainage.

L. Watering during the Plant Establishment Period shall consist of maintaining adequate (but not excessive) soil moisture at all times. Each tree planted shall have a slow release watering bag furnished and installed per manufacturer’s recommendation in addition to the watering requirements. It is recommended that after the initial thorough "watering in", every tree should receive a thorough watering, as necessary, at weekly intervals, on the average, throughout the growing season (approximately May 1 thru October 1). Avoid over watering all trees. **General** water guidelines for the average condition are as follows:

Plant Type	**Average Amount of Water Per Application**
Machine Transplanted Trees (3" caliper plus)	50 to 100 Gallons
Balled & Burlapped Trees	20 Gallons ±
Bare Root Trees	15 Gallons ±
Balled & Burlapped Shrubs	10 Gallons ±
Bare Root or Container Shrubs	7 Gallons ±

3.02 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove excess and waste materials, including unacceptable excavated material, trash, and debris from the job site.

END OF SECTION

SECTION 33 01 30

TELEVISION INSPECTION OF SEWERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes inspection of sewer lines by means of closed-circuit television.

B. Related Sections:
   1. Section 33 31 00 - Sanitary Sewer Systems
   2. Section 33 41 00 - Storm Sewer Systems

C. Method of Measurement:
   1. Measure by length in linear feet of sewer televised regardless of size or type.

D. Basis of Payment:
   1. Payment for acceptable quantities of televised sewer inspection shall be at the Contract Unit Price as listed on the Bid Form. All associated Work items shall be considered incidental.
   2. All information generated and the media on which it is provided shall become property of the Owner.

1.02 REFERENCES

A. NASSCO – National Association of Sewer Service Companies

1.03 DEFINITIONS

A. Pipe Segment: The length of pipe connecting 2 manholes.

1.04 SUBMITTALS

A. Video Inspection:
   1. Provide 2 copies of visual and audio record of inspection on DVD or USB Flash Drive.
   2. Features:
      a. Color, digital file format compatible with Microsoft Windows Media Player capable of recording audio and video components of inspection.
      b. Video display of footage counter continuously showing distance from reference point.
      c. Slow and stop motion.
      d. Speed: Maximum televising velocity of 30 to 35 feet of pipe per minute.
   3. Audio record should include:
      a. Date and time of inspection.
      b. Operator name.
      c. Street or surface location of reference manhole.
      d. Size and type of pipe being inspected.
      e. Direction of camera.
      f. Description of all significant items including:
         1) Broken or damaged pipe.
         2) Points of infiltration.
         3) Root intrusions.
         4) Scale and corrosion.
         5) Service connections.
         6) Pipe deflections.
         7) Other discernable features.
      g. Distance of each item from the reference manhole.
      h. Location of each item with respect to pipe axis.

4. Audio record shall correspond with written log.
5. Identify location and date of inspection on digital file storage media DVD or USB Flash Drive.

B. Written Logs:
1. Supply typewritten record of inspection on a standard format.
2. Written record should correspond with audio record.
3. Written record should include all information required for audio record.
4. Furnish 2 copies.

C. Photographs:
1. Supply photographs of specific items as requested by the City and as follows:
a. Pipe conditions of concern observed.
2. Features:
a. Digital.
b. Standard size, color.
3. Include with written log.
4. Furnish 2 copies.

1.05 QUALIFICATIONS

A. All Work shall be performed by NASSCO PACP-certified personnel who have been specifically trained for equipment used and who have experience in televised inspections.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Television Camera:
1. Specifically designed and constructed for operations associated with sewer inspection.
2. Adequate quality to accurately reproduce all colors and provide a clear, focused picture of the entire pipe interior for all conditions encountered.
3. Operative in 100 percent humidity conditions.
4. Adjustable mounting in order to center lens in a variety of pipe diameters.
5. Built-in light source positioned to minimize reflective glare.
6. Adjustable focal distance from 6 inches to infinity.
7. Articulating feature to provide for viewing of up to 90 degrees in all directions.
8. Variable speed operation propelled by:
a. Power winch.
b. Hand winch.
c. Self propelled.
9. Footage counter to measure distance traveled.

B. Television Monitor:
1. Vehicle mounted for viewing in a weather-protected environment.
2. Minimum Screen Size: 9-inch.
3. Minimum 350 line resolution color picture.
4. Display footage counter superimposed on screen.

2.02 ACCESSORIES

A. Provide:
1. Vehicles, as required.
2. 2-way radio/telephone communication equipment.
3. Video and audio signal cable.
4. Digital color video equipment.
5. Equipment to generate photographs from individual video frames.
6. Power source.
7. Winches and cables.

PART 3 EXECUTION

3.01 PREPARATION

A. Preliminary Work Performed by City:
   1. Locate and expose all manholes required for access to sewer system.
   2. Clean and flush pipe segments to be inspected.
   3. Provide access to manholes with adequate area for operation of inspection equipment and personnel.

3.02 PERFORMANCE

A. Description of Work:
   1. Propel closed-circuit television camera through designated pipe segments to document condition of pipe, joints, and service connections.
   2. Use in-place manholes for access to pipe segments.
   3. Operate camera from remote video monitor display.
   4. Record camera from remote video monitor display.
   5. Record camera output on digital video media for future viewing.
   6. Pipe segments to be inspected are shown on maps provided by the City.

B. Sewage Flow Control:
   1. When sewage flows in pipe segment to be inspected exceed minimum levels for a complete inspection of the pipe interior, perform one of the following control methods.
      a. Plugging and blocking:
         1) Provide plugs which will allow a controlled release of sewage flow.
         2) Insert plugs in the upstream manhole of the pipe segment to be inspected.
         3) As the inspection is performed, shut off or reduce flows to minimum acceptable level for adequate inspection.
      b. Bypass pumping:
         1) Eliminate flow in pipe segment to be inspected by inserting solid plugs in upstream manhole.
         2) Provide pumping equipment and conduits to transfer sewage flows from upstream side of the plug to a downstream manhole, around the pipe segment during the inspection.
   2. When excessive flow is entering pipe segment being inspected from outside source, Contractor shall proceed with one of the following methods:
      a. Coordinate with source owner to stop or reduce flow to acceptable levels.
      b. Reschedule inspection of pipe segment to when flows are at acceptable levels.

3.03 INSPECTION PROCEDURE

A. Move camera through entire pipe segment in a downstream direction.

B. Winches:
   1. Winch assembly shall not obstruct camera view.
   2. If non-remote control winch is used, provide 2-way communication between television monitor and winch operator.

C. Center lens in pipe area.

D. Maximum Camera Speed: 30 feet per minute.

E. Relay video signal from camera to monitor and digital video recorder.

F. Produce audio record concurrently with video record.

G. Stop camera when necessary to properly document significant items and take photographs as requested by Owner.

H. Use articulating feature to obtain the best possible view of service connections and other items.

I. Zero footage counter at inside wall of manhole in each pipe segment.

J. In case of obstruction in pipe segment, reset camera in downstream manhole and propel upstream to opposite side of obstruction.

3.04 FIELD QUALITY CONTROL

A. Verify accuracy of footage counter by measuring surface distance between manholes with a measuring wheel.

B. Footage counter shall be accurate to within 1 percent of the length of pipe segment.

END OF SECTION

SECTION 33 05 05

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Trenching requirements for underground piping and appurtenances, including requirements for excavation, backfill, and compaction.

B. Related Sections:
1. Section 01 33 00 - Submittal Procedures

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Trench Excavation: Excavation and backfilling of trench and associated excavation for pipe bedding shall be included in the price of pipe provided.
2. Pipe Bedding for PVC: All costs associated with providing the bedding material as shown on the Drawings and Standard Detail Plate No. BED-2 shall be considered incidental to the pipe material.
3. Rock Excavation: Measured from the top of the rock to a point 12 inches below the outside barrel of pipe and 12 inches from each side of outside diameter of pipe (at bell). The minimum trench width of Rock Excavation shall be 48 inches. For measurement purposes, volume will be computed based on vertical walls for the width specified above. Payment for Rock Excavation shall be at the Unit Price per cubic yard. Any additional Rock Excavation required for shelving or OSHA Standards will not be measured for payment and will be considered incidental to the Rock Excavation Bid Item:
   a. The estimated quantity of Rock Excavation shown in the various parts of the Bid Form were calculated as described above, based on the top of rock elevations determined by either soil borings and/or test hole excavations. No guarantee is made as to the actual quantity of Rock Excavation that will be encountered in this Project. No variation from the Unit Price for Rock Excavation will be considered or allowed due to quantity variation.
   b. Separate Bid Items have been provided for Rock Excavation – Soft Rock and Hard Rock. Payment will be made based on the method or rock excavation actually used in the field. Any excavation performed with a standard backhoe bucket will not be considered rock excavation.
4. Haul Excess Rock Off Site (LV): Measurement will be by the cubic yard of material hauled off site, based on a truck count. Payment will include all costs related to hauling and disposing of the material off the Site.
   a. Any excess rock hauled off site must be approved by Engineer prior to removing.
5. Sand Cushion: Measurement shall be by the units of linear feet. Payment at the Unit Price shall include all costs related to providing the material as shown on the Drawings and Standard Detail Plate.
6. Granular Backfill: Measurement shall be by the ton of material compacted in place as determined from weight tickets delivered to the Engineer and shall include all costs related to providing the material as shown on the Drawings and Standard Detail Plate.
7. Improved Pipe Foundation: Measurement shall be by the linear foot for each 6-inch layer placed below pipe bedding, not including the first 6 inches:

a. For example, if 2 feet of foundation material is required under a pipe; 6 inches of material is required for bedding, and payment will be made for 3 linear feet of pipe foundation material, 6 inches deep, per foot of pipe installed.
b. No payment will be made without the knowledge or consent of the Engineer.
c. No payment will be made for subgrade rock installed for de-watering purposes only, unless specified.
d. No payment will be made for disposing of excavated material off the Site that has been created by placement of improved pipe foundation.

8. Temporary Bracing and Sheeting: Considered part of the excavation costs with no additional compensation to Contractor, unless provided for otherwise.
9. Density Tests:
   a. Passing Tests: All costs paid by Owner.
   b. Failing Tests: All costs charged to and paid by the Contractor.
10. Dewatering: No explicit, direct payment is made for this work. Include the costs in the Unit Prices for the pipe or structure installed.
11. Private Utility Crossings: All costs related to exposing, protecting, and crossing an existing private utility line will be considered part of the excavation costs with no additional compensation to Contractor, unless a Bid Item has been specifically provided on the Bid Form for the crossing.
12. Excavation Special (Pothole Existing Private Utility): This Bid Item is for potholing and exposing existing private utilities that may be in conflict with the proposed public utilities for purposes of relocating by others or redesigning by the Engineer. Measurement will be per each location exposed regardless of the number of utilities in the respective location. Payment will include all cost related to exposing the potential conflict:
    a. The quantity shown on the Bid Form is an estimated amount. Payment will be based on the quantity actually used, regardless of the estimated quantity. No revision to the Contract Unit Price shall be considered or allowed due to variations of the actual quantity from the estimated amount.
13. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 (WisDOT Spec.):
   1. 207 – Embankment
   2. 209 – Granular Backfill
   3. 501 – Concrete

B. American Society of Testing Materials (ASTM):
   1. A798 -Standard Practice for Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications.
   2. D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

C. American Water Works Association (AWWA):
   1. C150 - Thickness Design of Ductile-Iron Pipe.
   2. C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast for Water.

1.04 SUBMITTALS

A. Provide the following submittals consistent with Section 01 33 00:
   1. Product Data for each Borrow Material:

a. Name and location of source.
b. Results of gradation tests.

1.05 DEFINITIONS

A. Bedding: The soil material adjacent to the pipe which makes contact with the pipe foundation, walls of the trench, and upper level of backfill. The purpose of bedding is to secure the pipe to true line and grade, and to provide structural support to the pipe barrel.

B. Foundation: Soil material beneath the pipe bedding.

C. Improved Pipe Foundation: Foundation provided by importing material from sources outside the Site. Required when foundation is soft or unstable.

D. Course Filter Aggregate: Free draining mineral product used around draintile pipe.

E. Rock Excavation (Hard Rock): Includes such rocks that are **not** decomposed, weathered, or shattered, and which will require blasting, hydro-hammering, barring, wedging, or use of air tools for removal. Also included are any boulders, concrete, or masonry structure (except concrete pavement, curb and gutter, and sidewalk) exceeding 1 cubic yard.

F. Rock Excavation (Soft Rock): Includes such rocks that are decomposed, weathered, or shattered, and which will require the use of ripping equipment, such as rock buckets and ripper hooks.

G. Pipe Zone: That part of the trench below a distance of 1 foot above the top of the pipe.

H. Sand Cushion: Aggregate bedding material used around pipe in areas where rock excavation is encountered, where pipe insulation is used, and when crossing existing utilities.

I. Granular Backfill: Includes the area below the subgrade and above the pipe zone when shallow pipe is installed in areas of rock excavation.

1.06 SEQUENCING AND SCHEDULING

A. Known existing underground utilities are shown on the Drawings in a general way. Owner does not guarantee the locations as shown on the Drawings. Anticipate variations in both the vertical and horizontal locations of underground utility lines from those shown on the Drawings.

B. Uncover utilities and verify both horizontal and vertical alignments sufficiently in advance of construction to permit adjustments in the Work. Determine location of existing utilities and identify conflicts before excavating trench for pipe installation.

C. Notify Diggers Hotline before starting construction in a given area, requesting utility locations in the field.

D. Provide continuance of flow of existing sewer and other facilities.

E. Backfill and compact all trench excavations promptly after the pipe is laid.

F. Salvage and re-spread existing topsoil within trench and spoil pile areas. This work shall be considered incidental to the pipe installation.

1.07 WARRANTY

A. Trench settlements that occur during the correction period and are greater than 1/2 inch as measured by a 10-foot straight edge will be repaired in a manner acceptable to the Owner at the Contractor's expense.

PART 2 PRODUCTS

2.01 PIPE BEDDING MATERIAL

A. Polyvinyl Chloride (PVC) Pipe and High Density Polyethylene (HDPE) Pipe:
   1. Comply with WisDOT Spec. 209.2.2 for granular backfill, modified with the following:
      a. No existing onsite granular material encountered during construction may be used unless approved by Engineer, based on quality control gradations provided by the Contractor for the onsite material being placed. The rate of testing will be determined based on changes of the existing material, or as determined by Engineer.
      b. 1 inch maximum aggregate size.
      c. Only virgin materials allowed.

B. Ductile Iron Pipe (DIP) and Reinforced Concrete Pipe (RCP):
   1. Comply to Detail Plate BED-1, Installation Type 3 or as identified on the drawings.

2.02 IMPROVED PIPE FOUNDATION MATERIAL

A. Comply with WisDOT Spec. 501.2:
   1. Course Aggregate: Comply with WisDOT Spec. 501.2.5.4, Size No. 1
   2. Crushing Requirements: At least 50 percent of the material by weight retained on the No. 4 sieve shall have 1 or more crushed faces.

2.03 SAND CUSHION MATERIAL

A. Comply with WisDOT Spec. 501.2.5.3, modified with the following:
   1. No existing onsite granular material encountered during construction may be used unless approved by Engineer, based on quality control gradations provided by the Contractor for the onsite material being placed. The rate of testing will be determined based on changes of the existing material, or as determined by Engineer.
   2. 1 inch maximum aggregate size.
   3. Only virgin materials allowed.

2.04 BACKFILL MATERIAL

A. Suitable materials selected from the excavated materials to the extent available and practical.

B. Suitable materials are mineral soils free of rubbish, trees, stumps, branches, debris, frozen soil, oversize stone (greater than 1 cubic foot), concrete and asphalt chunks, and other similar unsuitable material.

C. When suitable materials are not available, as determined by the Engineer, comply with WisDOT Spec. 209 for Granular Backfill.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to construction, inspect existing utility structures and surface features, and document condition.

B. Re-inspect foundation soils if rain fall or snow has occurred after initial inspection but prior to placing pipe and bedding.

C. Prior to construction, perform the Excavation Special (Pothole Existing Utility) for the purpose of determining possible conflicts between existing private utilities and proposed public utilities. Allow sufficient time for private utility companies to relocate facilities or Engineer to redesign public utilities.

3.02 PREPARATION

A. Notify Utility Owners to field mark their utility locations.

B. Protect as necessary surface features, such as utility poles, trees, structures, pavement, retaining walls, etc., that are not designated on the Drawings to be removed.

C. Notify utility companies of progress schedule so they can accomplish any necessary relocations and removals that they have agreed to relocate, remove, or support.

D. Implement traffic control.

E. Complete temporary removal or relocation of surface features, such as fences, shrubs, signs, and mailboxes.

F. Strip off existing topsoil from within the trench excavation limits and stockpile. Separate vegetative strippings from salvageable topsoil and dispose of appropriately.

G. Crossing Under Existing Utility Lines:
   1. Use extreme care when excavating in the vicinity of underground utility lines to avoid damage to protective coatings or surfaces.
   2. Where possible and as authorized by the utility, temporarily remove the utility line, install the new pipe, and reinstall the utility line.
   3. Where existing line cannot be removed or is not feasible to remove, securely support, excavate under, backfill under and around the utility line to 100-Percent Standard Proctor Density.
   4. Report and repair damaged lines prior to backfilling trench.

H. Rock Excavation:
   1. Contractor shall submit a blasting plan for review and approval by the Engineer.

3.03 CONSTRUCTION

A. Conform to ASTM D2321 and C1479, or modified herein.

B. Trench Excavation:
   1. Excavate trench to alignment and grade shown on the Drawings.

2. The trench width at the surface may vary and depends on the depth of trench and nature of the excavated material encountered. However, it shall be of ample width to permit the pipe to be laid and jointed properly and the backfill to be placed and compacted properly.
3. Correct any part of the trench that is inadvertently excavated below grade with approved material compacted to 100-Percent Standard Proctor Density.
4. Brace, shore, or sheet trench and provide drainage. Comply with applicable State Regulations relating to industrial safety to a safe angle of repose. Angle of repose may be no less than that required by the Accident Prevention Division of the State Industrial Commission or the requirements of the Occupational Safety and Health Act (OSHA), whichever is most restrictive.
5. Pile all excavated material in a manner that will not endanger the Work or obstruct sidewalks, driveways, gutters, etc.
6. Segregate soils in the excavated material that are not suitable for trench backfill and dispose of in a manner that is consistent with the requirements specified herein under "Backfill Above Pipe Zone."
7. Dispose of excess excavated materials off of right-of-ways and easements in a suitable site selected by the Contractor.
8. Haul materials, other than natural soil materials that are suitable as backfill material, to an approved landfill as directed by the Engineer.
9. It is anticipated that private utility crossings will be encountered and may interfere with the proposed public utilities:
    a. Pothole and expose existing private utility crossings to determine location and elevation.
    b. Perform construction activities in the vicinity of the private utilities so as not to disturb the existing crossings.
10. If frost thickness exceeds 6 inches, all frost chunks must be removed from the Site and non-frozen material must be used to backfill the excavation.

C. Water Control:
1. Dewater the ground as necessary to excavate the trench and install the pipe. All pipe and structures shall be laid in a dry condition prior to backfill. Maintain groundwater level a minimum of 1 foot below the pipe invert. Measure the rate of flow from dewatering pumps at the beginning of the dewatering operation(s) and once per week thereafter. Keep a daily log of hours pumped.

D. Trench Bottom:
1. Excavate to a sufficient depth to insure adequate foundation when the bottom of the trench is soft or where in the opinion of the Engineer unsatisfactory foundation conditions exist. Bring excavation up to pipe grade with thoroughly compacted granular materials meeting the requirements of Improved Pipe Foundation Material.
2. Provide temporary support, remove, relocate, or reconstruct existing utilities located within the trench excavation. Utility shall designate method employed. Use particular care and provide compacted fill or other stable support for utility crossings to prevent detrimental displacement, rupture, or failure.
3. Excavate to expose existing utilities that cross in close proximity to the planned pipe line to determine the utilities' exact location sufficiently ahead of pipe installation to plan for the avoidance of grade conflict. Measure to determine the utilities' location relative to the planned pipe line location. A deviation from the alignment, grade, and location to avoid conflict may be ordered by the Engineer.
4. In locations where rock affects the pipe foundation, excavate the trench 12 inches below the pipe and place sand cushion material up to the top of the pipe zone. Blend suitable on Site backfill material with any rock (1 cubic foot maximum size) that is placed back in trench. Dispose of excess rock at a suitable location outside the Site:

a. Sand Cushion: The removal and disposal of the unsuitable material within the trench and below the invert elevation, and the replacement up to invert elevation with the appropriate bedding material.
b. Granular Backfill: The removal and disposal of unsuitable material within the trench, above the pipe zone, and replacement up to the subgrade with appropriate backfill material, per Detail BED-4. No additional compensation will be allowed for wider or deeper trenches in rock excavations.
c. For PVC and HDPE Pipe, the sand cushion shall be placed to 1 foot above the pipe and shall be paid as pipe bedding. The remainder of the trench up to the top of the rock shall be backfilled with granular backfill material.

5. Improved Pipe Foundation: When unsatisfactory foundation conditions exist, excavate to a depth consisting of solid materials. Fill to pipe grade with thoroughly compacted granular materials meeting the requirements of Improved Pipe Foundation Material.

3.04 PIPE BEDDING

A. PVC Pipe: Bed pipe in accordance with ASTM D2321.
1. In accordance with Standard Detail Plate BED-2.

B. RCP: Bed pipe in accordance with ASTMC1479.
1. In accordance with Standard Detail Plate BED-1.

C. DIP: Bed pipe in accordance with AWWA Standard C150 and C151.
1. In accordance with Standard Detail Plate BED-1.

D. HDPE Pipe: Bed pipe in accordance with ASTM D2321.
1. In accordance with Standard Detail Plate BED-2.

E. Corrugated Metal Pipe: Bed pipe in accordance with ASTM A798.
1. In accordance with Standard Detail Plate BED-1.

F. The trench directly under the pipe shall be loosely placed un-compacted material per the Standard Detail Plates.

G. Use only selected materials free from rock, boulders, debris, or other high void content substances to a level 1 foot above the top of pipe. Remove ledge rock, boulders, and large stones to provide at least 6-inch clearance from pipe.

H. Dig bell holes of ample dimension at each joint such that the pipe barrel rests continuously on the bedding.

3.05 BACKFILL WITHIN PIPE ZONE

A. Backfill immediately after pipe is laid. Restrain pipe as necessary to prevent their movement during backfill operations.

B. Place material completely under pipe haunches in uniform layers not exceeding 4 inches in depth.

C. Hand (shovel/slice) and tamp along pipe within haunch zone to provide a solid pipe foundation.

3.06 BACKFILL ABOVE PIPE ZONE

A. Use suitable materials meeting the requirements of Backfill Material.

B. Place in uniform depth layers not to exceed 12 inches before compaction. Complete the compaction of each layer before placing material for the succeeding layer.

C. Compact each layer by mechanical means until it meets the requirements of WisDOT Spec. 207.3.6.3 "Special Compaction," except as modified herein:
   1. Trenches shall be compacted to a minimum of 95 percent, except to 100 percent in the upper 3 feet.
   2. Trenches between existing or future buildings or structures shall be compacted to a minimum of 100 percent for the entire depth of the trench.

D. The method and means of placement and type of compaction equipment used is at the discretion of the Contractor. However, all portions of the trench backfill must meet minimum specified compaction requirements.

E. Any deficiency in quantity of backfill material (caused by shrinkage or settlement) shall be supplied at no additional cost to the Owner.

F. Excavated material not suitable or required for backfill shall be disposed of outside of the Site.

G. It is assumed that all backfilling of trenches will be performed using on Site, excavated trench material. If the Contractor is unable to meet the specified density requirements using that material due to excess moisture content or other circumstance beyond their control, they shall immediately notify the Engineer of such condition. Following investigation of the circumstances, the Engineer, Contractor, and Owner shall mutually agree upon the proper course of action to address the issue.

H. Any excavated rock that is placed back in the trench shall be crushed to a maximum rock size of 12 inches and adequately mixed with suitable on Site backfill material before being placed and compacted in the trench.

3.07 FIELD QUALITY CONTROL

A. Density Tests: To be performed by an approved soils testing firm at various locations and depths throughout the Site as directed by the Engineer. Cooperate fully and provide assistance as necessary to complete these tests.

B. Failed density test areas shall be excavated and re-compacted until the density requirements are met.

END OF SECTION

SECTION 33 05 17

ADJUST MISCELLANEOUS STRUCTURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Adjustment of utility structures.

B. Related Sections:
   1. Section 01 57 13 – Temporary Erosion and Sediment Control
   2. Section 33 11 00 – Water Distribution Systems

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Bid Items have been provided for various adjustments. Payment at the Bid Unit Price for all items is considered compensation in full for all materials and Work required to furnish and install the Bid Item in place.
   2. Adjust Manhole Casting and Adjust Valve Box:
      a. New and Existing Manholes and Valve Boxes Within Paved Areas:
         1) Payment for adjustment to initial asphalt grade shall be made for new and existing manholes and valve boxes where no reconstruction of the structure is performed on the basis of each structure adjusted as specified.
         2) Payment for adjustment to final grade for new and existing manholes and valve boxes shall be made for each structure adjusted as specified.
         3) Adjust Manhole Casting (Cast Iron Manhole Adjusting Ring): Measurement will be per each structure adjusted by means of furnishing and installing steel adjusting ring as specified.
         4) No separate payment for initial adjustment to initial asphalt grade will be made for existing structures that are reconstructed. Initial adjustment of the structure shall be considered incidental to the Bid Items for the reconstruction of each type of structure.
      b. New Manhole and Valve Boxes In Non-Paved Areas:
         1) No separate payment for adjustment to final grade will be made. Adjustment of the structure shall be considered incidental to the Bid Items for the furnishing and installation of each type of structure.
      c. Existing Valve Boxes In Non-Pavement Areas:
         1) Payment for adjustment of the valve box to final grade shall be made for each valve box as specified.
   3. Adjust Catch Basin Casting:
      a. New and Existing Catch Basins:
         1) Payment for adjustment to final concrete curb and gutter grade shall be made for new and existing catch basins on the basis of each structure adjusted, as specified:
            a) Furnishing and installing erosion control around structure will be paid in accordance with Section 01 57 13.
   4. Extend Hydrant Barrel: Measurement will be by the linear foot of adjustment made, including the heavy-duty rod assembly, if required.
   5. Valve Box Extension: Payment for the furnishing and installation of valve box extension sections on either new or existing valve boxes shall be made on the basis of the linear feet of extension sections installed.

6. All work associated with the surfacing removal, excavation, material replacement, compaction, and patching necessary for the adjustment of structures within asphalt surfaced areas shall be considered incidental to the adjustment.
7. For street reconstruction or rehabilitation projects, or if required by the Engineer, use of parachute is incidental to manhole adjustment.
8. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. American Society of Testing and Materials (ASTM):
   1. ASTM A48 – Specification for Gray Iron Casting.
   2. ASTM D1248 – Polyethylene Plastics Molding and Extrusion Materials.

B. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition including all current supplements (WisDOT):
   1. Section 611 – Catch Basins, Manholes, and Inlets.

1.04 DEFINITIONS

A. Adjust Manhole or Catch Basin Casting: A change in rim elevation accomplished for manholes or catch basins through the addition or removal of adjustment rings only. Adjustment does not include the addition or removal of sections from the structure.

B. Adjust Valve Box: A change in elevation of the top of the valve box accomplished through the raising or lowering of the existing top section of the valve box only. Adjustment does not include the addition or removal of sections from the valve box.

C. Remove and Replace Adjustment Rings: The process of removing the existing concrete adjustment rings from an existing structure and placing new rings on manholes and catch basins.

1.05 SEQUENCING AND SCHEDULING

A. Contractor, Engineer, and Owner shall inspect all existing structures prior to beginning construction.

B. Owner will remove any foreign material found in the existing structures prior to construction. Remove any foreign material that enters the structures during construction. Notify owner any time foreign materials enter structures regardless of the amount of material.

C. When temporarily removing existing castings and valve box top sections, place castings and valve top sections in the boulevard area directly behind the curb, and in line with the existing structure for the purpose of locating the plated structure and valve box.

D. Use care when removing asphalt surfacing around existing structures to avoid damage to existing materials. Replace any castings or valve box materials damaged during the surfacing removal with equal materials at no cost to the Project.

E. Asphalt street patching associating with the structure adjustment shall be completed the same day as the structure is adjusted, including manhole casting protection.

PART 2 PRODUCTS

2.01 ADJUSTING RING

A. High-Density Polyethylene (HDPE):
   1. Molded high-density polyethylene conforming to ASTM D1248.

B. Cast Iron Manhole Adjusting Ring:
   1. R-1979 Series adjusting ring as manufactured by Neenah Foundry, or approved equal.

2.02 ADHESION MATERIALS

A. Ram-Nek material, or approved equal.

B. Cast Iron Manhole Adjustment Ring Adhesive per manufacture recommendations.

C. Sealant (For HDPE Rings):
   1. DOW 999 – A building caulking and glazing sealant, or approved equal.
   2. Open cell polyurethane foam sealant with adhesive backing.

2.03 HYDRANT EXTENSIONS

A. Sections: Match existing hydrant manufacturer and model.

2.04 CASTINGS

A. Manhole, Catch Basin Frames, and Covers:
   1. Requirement: ASTM A48.
   2. Material: Class 35 cast iron. Best grade. Free from injurious defects and flaws.
   3. Finish: Coal tar pitch varnish.
   4. Finish Preparation: Sandblast.
   5. Machine cover and frame contact surface for non-rocking protection.
   6. Type and Style:
      a. Sanitary Manholes:
         1) NEENAH R-1642 Type "B", Platen Lid **with Self-Sealing application**, 2 concealed pick holes, or approved equal. Covers stamped with "SANITARY SEWER". Use 2-inch letters.
      b. Storm Manholes:
         1) NEENAH R-1642 Type "B", Platen Lid, Open Hole, or approved equal. Covers stamped with "STORM SEWER". Use 2-inch letters
      c. Catch Basin Manholes and Catch Basins:
         1) NEENAH R-3067-V, and R-3067-VB, or approved equal.
      d. Off Road Catch Basin Manholes (Beehives):
         1) NEENAH R-4342, or approved equal.
      e. Miscellaneous:
         1) Short casting for Manholes: NEENAH R-1642-A, short casting – 5" height, as approved by Engineer.
         2) Catch Basins within Driveways: NEENAH R-3290-A (Type A grate), or approved equal,
         3) Water Tight Casting: NEENAH R-1755 G.

2.05 VALVE BOX

A. Risers: Conform to Section 33 11 00.

2.06 GEOTEXTILE

A. Non-woven geotextile fabric for use in conjunction with HPDE rings.

2.07 EXTERNAL SEAL

A. Manufactured by Adaptor, Inc., or approved equal.

PART 3 EXECUTION

3.01 GENERAL

A. Conform to WisDOT Section 611, except as modified below.

B. The necessary vertical alignment will be determined by the Engineer and generally as indicated on the schedule of adjustments.

C. Where existing frame is within 0.10 feet of grade, no adjustment is to be made.

D. Raise or lower the frame to match the street or gutter.

E. Protect existing structures from damage.

F. Prevent sand, concrete, or any other debris from entering the structures.

G. HDPE rings to be used on all structures.

H. Adjust all structures located in non-pavement surface areas to final design grade.

I. Existing structures: Immediately following removal of existing casting and adjusting rings, cover structure opening with suitable steel plate to prevent foreign debris from entering structure. Secure plate to top slab or cone with Ram-Nek.

J. For street reconstruction/rehabilitation projects, or if required by the Engineer, use parachute or approved equal to prevent debris from entering structures while active work is being done on or near an existing structure.

K. Utilize ½ inch thick pucks on valves and ½ inch thick circular plates on manhole castings for all paving of streets, driveways, trails, and parking areas.

3.02 PREPARATION

A. Call Diggers Hotline for field marking of utility locations.

3.03 ADJUST MANHOLE AND CATCH BASIN FRAME

A. HDPE Adjusting Ring:
   1. See Details STR-16 and STR-17.
   2. Remove all dirt, debris, dust, and other deleterious material from surface prior to placement of first ring.

3. Install adhesive for manhole adjusting rings as per the following:

Location of Sealant	Type of Sealant
Between casting and last ring:	3/4 inch by 3/4 inch open cell polyurethane foam sealant and 1/2-inch bead of DOW 999
Between intermediate rings:	1/2-inch bead of DOW 999
Between cone/top slab and first ring:	3/4 inch by 3/4 inch open cell polyurethane foam sealant and 1/2-inch bead of DOW 999

4. Sealant to be placed around entire circumference of each unit with no gaps.
5. Utilize a variety of thickness of flat units and sloping units to match the required grade and slope of the area at the location of the structure:
   a. Shims are not allowed.
6. Total Thickness of Rings Allowed: Minimum of 3 inches, maximum of 12 inches.
7. Wrap entire casting and ring system with geotextile. For structures with cone section, geotextile wrap to extend over a minimum length of 18 inches of the cone.
8. For manholes outside of paved areas, an external seal shall be installed to cover the entire height of rings and per manufacturer recommendation.

B. New adjusting rings shall be used on all casting adjustments, regardless of whether casting is salvaged, existing, or new.

C. Patch road to match existing pavement section.

D. Cast Iron Manhole Adjusting Ring:
   1. Install per manufacturer's recommendations.
   2. Apply adhesive as recommended by the manufacture.
   3. Only 1 steel ring allowed for adjustment from initial lift wearing course grade to final wearing course grade.

3.04 ADJUST VALVE BOX

A. Adjust box by screwing top section up or down.

B. Prevent sand, chunks of concrete, or any other debris from entering the valve box:
   1. Short sections inserted inside the existing top section are not allowed to perform adjustment, unless specified.

C. Install approved sections as needed for extension by removing top section, installing additional extension, and re-installing top section.

D. Patch road to match existing pavement section.

3.05 HYDRANT EXTENSIONS

A. Remove upper section.

B. Install extension kit as per manufacturer's requirements.

C. Replace upper and lower rod assemblies with heavy-duty for extensions in excess of 18 inches.

D. Replace the upper section.

3.06 SCHEDULE OF ADJUSTMENTS

A. Manholes Outside of Paved Areas:
   1. Permanently adjust casting to design rim elevation at time of structure installation or reconstruction.

B. Manholes Within Street Areas with Concrete Curb and Gutter (Final Asphalt Course Paved the Same Year as the Initial Course):
   1. At time of structure installation or reconstruction, install casting directly upon top slab or cone section with Ram-Nek material.
   2. Prior to street construction, remove casting from all new and existing manholes and cover structure opening with suitable steel plate. Secure plate to top slab or cone with Ram-Nek.
   3. Following initial asphalt paving perform adjustment:
      a. Locate structure and expose.
      b. Remove steel plate. Permanently place HDPE rings on structure. Permanently place casting on top ring with adhesive. Wrap filter fabric over casting and rings. For structures with cone section, fabric shall extend a minimum of 18 inches down cone.
      c. Replace and compact gravel base material with a vibratory plate compactor. Patch initial asphalt course around structure per Detail STR-17.
      d. Top of casting to be 3/8 to 5/8 inch lower than the final asphalt pavement grade, as measured with a 6-foot straight edge centered on the structure.
      e. Perform adjustment no more than 5 working days prior to placement of final asphalt pavement, unless approved by Engineer.

C. Manholes Within Street Areas with Concrete Curb and Gutter (Final Asphalt Course Paved the Following Year or Later):
   1. At time of structure installation or reconstruction, install casting directly upon top slab or cone section with Ram-Nek material.
   2. Prior to street construction, remove casting from all new and existing manholes and cover structure opening with suitable steel plate. Secure plate to top slab or cone with Ram-Nek.
   3. Following initial asphalt paving perform adjustment:
      a. Locate structure and expose.
      b. Remove steel plate. Permanently place HDPE rings on structure. Permanently place casting on top ring with adhesive. Wrap filter fabric over casting and rings. For structures with cone section, fabric shall extend a minimum of 18 inches down cone.
      c. Replace and compact gravel base material with a vibratory plate compactor. Patch initial asphalt course around structure per Detail STR-17.
      d. Top of casting to be 3/8 to 5/8 inch lower than the initial asphalt course grade, as measured with a 6-foot straight edge centered on the structure.
      e. Adjustment of all manholes must be completed within 15 working days after the start of placement of the initial asphalt course. Adjustment will not be allowed prior to initial asphalt paving.
   4. Prior to final asphalt paving (the following year or later), perform adjustment:
      a. Permanently adjust casting to final grade with steel adjusting ring.
      b. Top of casting to be 3/8 to 5/8 inch lower than the final asphalt grade, as measured with a 6-foot straight edge centered on the structure.
      c. Perform adjustment no more than 5 working days prior to placement of final asphalt course, unless approved by Engineer.

D. Street Catch Basins:
   1. At time of structure installation, place HDPE rings and casting on dry.
   2. Establish erosion control around structure per Section 01 57 13. Structure to be allowed to accept runoff during this condition. Basin grate shall not be covered with fabric or other impervious material.
   3. Immediately prior to concrete curb and gutter installation, remove erosion control and permanently adjust casting to proper grade.
   4. Pour concrete curb and gutter adjacent to structure, permanently setting casting into curb line.

E. Valve Boxes Outside of Paved Areas:
   1. Permanently adjust box to design rim elevation at time of valve installation.

F. Existing Valve Boxes Outside of Paved Areas:
   1. Permanently adjust box to design rim elevation prior to final restoration work.

G. Valve Boxes Within Street Areas with Concrete Curb and Gutter (Final Asphalt Course Paved the Same Year as the Initial Course):
   1. At time of valve installation, install box.
   2. Prior to street construction, lower top section of box sufficiently to avoid damage during street base construction.
   3. Perform adjustment prior to final asphalt paving:
      a. Locate box and expose.
      b. Adjust box to final asphalt pavement grade by raising of top section.
      c. If top section cannot be raised to proper grade, install valve box extension section.
      d. Replace and compact gravel base material with a vibratory plate compactor. Patch initial asphalt course around structure per Detail STR-17.
      e. Top of box to be 3/8 to 5/8 inch lower than the final asphalt pavement grade, as measured with a 6-foot straight edge centered on the box.
      f. Perform adjustment no more than 5 working days prior to placement of final asphalt pavement, unless approved by Engineer.

H. Valve Boxes Within Street Areas with Concrete Curb and Gutter (Final Asphalt Course Paved the Following Year or Later):
   1. At time of valve installation, install box.
   2. Prior to street construction, lower top section of box sufficiently to avoid damage during street base construction.
   3. Perform adjustment following initial asphalt paving:
      a. Locate box and expose.
      b. Adjust box to initial grade by raising of top section.
      c. If top section cannot be raised to proper grade, install valve box extension section.
      d. Replace and compact gravel base material with a vibratory plate compactor. Patch initial asphalt course around structure per Detail STR-17.
      e. Top of box to be 3/8 to 5/8 inch lower than the initial asphalt grade, as measured with a 6-foot straight edge centered on the box.
      f. Adjustment of valve boxes must be completed within 15 working days after the start of placement of the initial asphalt pavement. Adjustment will not be allowed prior to paving.
   4. Prior to final asphalt paving (the following year or later), perform adjustment:
      a. Remove asphalt around valve box. Remove sufficient material to allow for compaction of the gravel base.
      b. Adjust box to final asphalt pavement grade by raising of top section.
      c. If top section cannot be raised to proper grade, install valve box extension section.
      d. Replace and compact gravel base material with a vibratory plate compactor. Patch initial asphalt course around structure per Detail STR-17.

e. Top of box to be 3/8 to 5/8 inch lower than the final asphalt pavement grade, as measured with a 6-foot straight edge centered on the box.
f. Perform adjustment no more than 5 working days prior to placement of final asphalt pavement, unless approved by Engineer.

3.07 TRAFFIC CONTROL

A. Place construction advisory signs, 36 inches by 36 inches, stating "Construction Zone" and "Proceed at Your Own Risk" in black letters on an orange field at all entrances to the Project prior to beginning final adjustment of structures within paved areas.

B. Exposed edges of manhole castings and valve boxes raised prior to final asphalt paving shall be painted with "White" or "Pink" paint.

C. Provide appropriate traffic control devices to protect the traveling public during all phases of the structure adjustment work.

3.08 FIELD QUALITY CONTROL

A. For adjustments made within paved areas, any settlements of the pavement surfacing below the rim of the adjustment structure will require removal and replacement of the pavement surfacing at the expense of the Contractor.

B. Secure manholes and structures immediately after completion or before suspension of operations at the end of working day with castings or suitable alternative device.

C. Adjust manhole and catch basin frames as described above. Thorough tamping of the material around manhole and catch basin frames is required. Where existing frame is within 0.10 feet of grade, no adjustment is to be made. In such cases the crown or gutter shall be either lowered or raised, as the case may be, to put the street and frame at the same grade.

D. No shims of any material will be allowed.

E. Adjust valve boxes as described above. Thorough tamping of the material around the valve box is required. All valve boxes shall be clean, straight, plumb, and keyable allowing a pipe to be placed and centered over the valves operating nut from the street surface per Section 33 11 00, paragraph 3.01.D. This alignment check will be performed on all valves after the final adjustment of the valve box and prior to placement of the final pavement. Supply the alignment tool and perform this test with the Owner's representative.

F. Settlements around structure adjustments that occur during the correction period and result in the casting being higher than the final pavement will be repaired in a manner acceptable to the Owner at the Contractor's expense.

G. Clean all lids of all gravel and asphalt during paving operations while asphalt is hot.

END OF SECTION

SECTION 33 05 20

HORIZONTAL DIRECTIONAL DRILLING (HDD) PIPE INSTALLATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes installation of underground pipe using Horizontal Directional Drilling (Guided Boring) method.

B. Related Sections:
   1. Section 31 23 33 - Trench Excavation and Backfill
   2. Section 33 05 50 - Surface Facility Restoration
   3. Section 33 11 00 - Water Distribution Systems

C. Method of Measurement:
   1. HDD Pipe Installation:
      a. Measure by distance in linear feet for each size and type of pipe successfully installed and accepted for use.
      b. Measure in the horizontal plane along the axis of the installed pipe.
      c. Any deviations from the proposed distances shown on the Drawings shall be approved by Utility and Engineer.

D. Basis of Payment:
   1. Bid Price includes:
      a. Pipe.
      b. Drilling.
      c. Boring, receiving, and verification pits.
      d. Pipe adaptors.
      e. Observation wells.
      f. Pipe testing and disinfection.
      g. Wasted pipe at entry and exit points.
      h. Abandoned pipe.
   2. Payment for acceptable quantities of HDD shall be at the Contract Unit Price as listed on the Bid Form. All associated Work items shall be considered incidental.

1.02 REFERENCES

A. ASTM:
   1. D2667 - Standard Practice for Heat Joining Polyolefin Pipe and Fitting
   2. D3261 - Standard Specification for Butt Fusion Polyethylene (PE) Plastic Fittings for PE Plastic Pipe and Tubing
   3. F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR - PR) Based on Outside Diameter
   4. F905 - Standard Practice for Qualification of Saddle Fusion Joints

B. AWWA:
   1. C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
   2. C116 - Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
   3. C150 - Thickness Design of Ductile Iron Pipe
   4. C151 - Ductile-Iron Pipe, Centrifugally Cast for Water or other Liquids
   5. C153 - Ductile-Iron Compact Fittings for Water Service
   6. C906 - AWWA Standard for HDPE Pipe
   7. C600 - Installation of Ductile Iron Water Mains and their Appurtenances

1.03 DEFINITIONS

A. Horizontal Directional Drilling (HDD) Pipe Installation (also known as Guided Boring): Method of trenchless construction producing continuous bores using a surface launched, remotely steerable, electronically monitored drilling tool controlled from a mobile drilling frame, and including a field power unit, mud mixing, storage and recycling system, and mobile spoils extraction system.

B. Utility: Refers to the City of Hudson Public Utilities

C. IPS: Iron Pipe Size.

D. HDPE: High Density Polyethylene.

E. DIP: Ductile Iron Pipe

1.04 SYSTEM DESCRIPTION

A. HDD Process:
   1. Excavate drilling and receiving pits.
   2. Install drilling frame in drilling pit.
   3. Drill pilot hole to receiving pit in conformance with proposed alignment and grade of proposed pipe.
   4. Control toolhead by means of real time guidance system that measures inclination, roll, and azimuth.
   5. Stabilize the bore hole with drilling fluids approved by Wisconsin DNR Bureau of Drinking Water and Groundwater.
   6. Remove toolhead and install drill string and pipe in receiving pit.
   7. Pull drill string and pipe back to drilling pit along pilot hole alignment.
   8. Pilot hole is enlarged as required to accommodate pipe during pullback.
   9. Remove excess spoils generated during pipe installation by vacuum extraction.

1.05 SUBMITTALS

A. Product Data:
   1. Drilling Fluid:
      a. Manufacturer.
      b. Components.
      c. Special precautions.
      d. Manufacturer’s recommended method of mixing and application.
      e. Manufacturer’s recommendation for storage and handling.
      f. Material Safety Data Sheet (MSDS).
   2. Equipment:
      a. Detailed description of equipment and tools.
      b. Size and capacity.
      c. Piping materials.
      d. Setup requirements.
      e. Type and size of cutting toolhead and backreaming tool.
      f. Type of pipe joining equipment.
   3. Written Procedures for:
      a. Proposed pipe staging and installation.
      b. Dewatering.
      c. Monitoring and control of line and grade.
      d. Time requirement for joint fusion.
      e. Line and grade correction.
   4. Construction schedule for installations.

B. Shop Drawings:
   1. Location and Dimensions for:
      a. Drilling and receiving pits.

b. Product joining and staging areas.

C. Quality Assurance:
1. Qualifications and experience of field supervisors and boring machine operators.
2. Previous HDD boring project references.

D. Revised Drilling Equipment, Methods and Procedures:
1. If Contractor determines that modifications to the methods and equipment, as stated in the submittals, are necessary during construction, Contractor shall immediately notify the Engineer verbally, followed by a written plan within 24 hours, describing the modifications and reasons for the changes.

E. Drilling Fluid Testing Results During Drilling and Pullback:
1. Fluid density.
2. Marshall Funnel Viscosity.
3. pH.
4. Sand content.
5. Gel strength.
6. Filtrate and filter cake.

F. A plot of horizontal and vertical alignment of pilot hole in intervals of not more than 30 feet. Notify the Engineer verbally of deviation from plan alignment and profile. Provide daily plot of alignment and profile.

G. Logs of pullback pressures for each setup upon completion of bore and pipe installation.

H. Certificates: Provide Certificates of Compliance from the manufacturer certifying that the HDPE pipe and fittings meet the requirements listed in this section.

1.06 QUALITY ASSURANCE

A. Minimum Qualifications for Field Supervisors and Boring Machine Operators:
1. 3 previous installation projects.
2. Minimum of 100,000 feet of boring successfully completed.,

B. References from Previous HDD Boring Installation Projects.
1. Owner's name and contact person.
2. Data and duration of project.
3. Size(s) and length(s) of pipe bored.
4. Contents of the pipeline.

C. Provide qualified field supervisor on Site at all times when boring operations are in progress.

D. Demonstrate pipe-joining process, using intended personnel and equipment, to City and Engineer prior to initial boring.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Check materials upon delivery to assure that proper material has been received.

B. Store drilling fluid components in accordance with manufacturer's recommendations.

1.08 SITE CONDITIONS

A. Contractor is responsible for all costs associated with encountering obstructions. Adjust methods, alignment, or perform open pit operations to dislodge stuck equipment of product at no additional cost to City.

PART 2 PRODUCTS

2.01 MATERIALS

A. HDPE Pipe:
   1. AWWA C906.
   2. IPS: DR 11 - 160 psi water pressure.
   3. Heat fused joints.
   4. NSF: Standard No. 14 and No. 61 (by size and order).
   5. PPI Designation: PE 3408.
   6. Cell Classification: ASTM D3350 - PE 345444C.
   7. Material Description: ASTM D3350 - Type III, Grade PE 34.
   8. Color:
      a. Water Main: Black with blue stripe.
      b. Sewer: Black with green stripe.
   9. Continuously mark pipe with the following information:
      a. Size and dimensions.
      b. Name of manufacturer.
      c. Cell class.
      d. ASTM basis.
      e. Pipe test category.
      f. Plant identification.
      g. Production data.
      h. Operator number.
      i. Resin supplier code.

B. Pipe Adaptors:
   1. Mechanical joint, fully restrained.
   2. ASTM D3261.
   3. Same resin type and cell classification as pipe.
   4. Driscopipe, or equal.

2.02 BORING EQUIPMENT

A. High pressure, low volume fluid cutting process capable of dispensing drilling fluid to the surrounding materials as it proceeds.

B. Remotely steerable.

C. Provide for electronic monitoring of depth and location.

D. Capable of placing pipe to a depth of 16.5 feet with a 1-foot tolerance.

E. Capable of a 90-degree turn within a 300-foot radius.

F. Provide for mobile spoils removal from entry and exit pits and return areas caused by fracturing.

G. Include alarm system capable of detecting electrical current.

H. Guidance System:
   1. Capable of measuring inclination, roll, and azimuth.
   2. Independent means to insure accuracy of installation.
   3. Capable of accurately producing installation alignment and profile records.
   4. Steering Equipment:
      a. House in a non-magnetic bottom-hole of the lead drill pipe section.
      b. Provide for in-hole deviation at the front during pilot hole drilling.
      c. Position lead section along same alignment as the proposed crossing from entry to exit.
   5. Separate magnetized pilot work-string from steering guidance probe by means of 2 non-magnetic drill collars behind the bottom-hole assembly.

6. Include remote tool locating device capable of detecting the position of the cutting head within the following tolerances:
    a. Elevation: 1 inch per 5 feet of depth.
    b. Alignment: 2 inches per 5 feet of depth.

2.03 BENTONITE CLAY COMPONENT

A. Appearance: Off-white to tan powder.

B. Chemical Definition:
1. Untreated Wyoming bentonite.
2. Hydrous silicate of alumina composed of sodium montmorillinite clay.

C. Specific Gravity: 2.6 to 2.7.

D. Bulk Density:
1. Uncompacted: 71 pounds per foot, plus or minus 3.
2. Compacted: 74 pounds per foot, plus or minus 3.

E. Unit Weight: 2.4 pounds per quart.

F. pH: 8.8 (6 percent in water suspension).

G. Mineralogical Analysis (x-ray diffraction):
1. Montmorillinite: 85 percent, plus or minus 5.
2. Quartz: 5 percent, plus or minus 1.
3. Feldspars: 5 percent, plus or minus 1.
4. Cristobalite: 2 percent, plus or minus 0.2.
5. Illite: 2 percent, plus or minus 0.2.
6. Calcium and Gypsum: 1 percent, plus or minus 0.05.

H. Chemical Analysis:
1. S_1O_2: 55.44 percent, plus or minus 5.
2. $A1_2O_3$: 20.14 percent, plus or minus 2.
3. Fe_2O_3: 3.67 percent, plus or minus 0.2.
4. CaO: 0.49 percent, plus or minus 0.05.
5. MgO: 2.49 percent, plus or minus 0.2.
6. Na_2O: 2.76 percent, plus or minus 0.2.
7. K_2O: 0.6 percent, plus or minus 0.05.
8. Bound Water: 5.5 percent, plus or minus 0.05.
9. Moisture at 220 degrees F: 8 percent, plus or minus 0.5.

2.04 DRILLING FLUID MIXTURE

A. Inert mixture of water and bentonite clay.

B. Add cement of polymer extenders as required.

C. Coordinate with Utility to obtain water supply for on-site mixture.

2.05 ACCESSORIES

A. Tracer Wire:
1. Copperhead Industries.
2. Direct burial No. 12 AWG solid, 0.0808-inch diameter.
3. Steel core hard drawn extra high strength 1,150 pound average tensile break load.
4. 45 mil high molecular weight-high density polyethylene blue color jacket complying with ASTM D1248.
5. 30 volt rating.

B. Test Station:
   1. Tracer wire test stations shall be installed at each boring pit location (including gate valve and/or hydrant locations).
   2. Each tracer wire test station shall be marked and identified with Tri-View Flex test station containing two internal terminals manufactured by Rhino Marking & Protection Systems or approved equal.
   3. Test stations for water shall be blue with Rhino Part #TVTI72BB2 or approved equal and shall contain one decal on each side of test station with Rhino Part #GD8-1332K or approved equal.

2.06 TAPPING SADDLES

A. High Density Polyethylene (HDPE) Water Main:
   1. One of the following saddles shall be used:
      a. Side fusing tapping saddle as manufactured by Poly-Cam, Inc. or approved equal.
      b. Electrofusion Corp. saddle as manufactured by Central Plastics Company or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Field verify the location and depth of all utilities and other facilities that are within or adjacent to the proposed boring alignment.

3.02 PREPARATION

A. Excavate access pits in accordance with Section 31 23 00 and the reviewed Shop Drawings.

B. Locate pits to minimize the number required and to facilitate pipe installation in continuous runs.

C. Control ground water as required to maintain pits in a dry and stable condition.

3.03 CONSTRUCTION

A. Initial Boring:
   1. The entry angle of the pilot hole and the boring process shall maintain a curvature that does not exceed the allowable bending radius of the pipe.
   2. Notify Utility and Engineer prior to making any adjustments in alignment or grade.

B. Pipe Installation:
   1. After initial boring is complete, install a swivel, circulating sub and reamer at the termination pit and pull pipe back to starting pit.
   2. Apply drilling fluid as required to maintain borehole stability and reduce frictional drag.
   3. Maximum reaming diameter: 1.4 times the pipe diameter.
   4. Protect and support pipe above ground to provide free movement and prevent damage from ground debris.
   5. Pullback forces shall not exceed the allowable pulling forces of the pipe.
   6. Provide sufficient pipe length to extend past termination point for connections to adjacent pipe sections or manholes.
   7. Allow installed pipe to stabilize for 24 hours prior to making tie-ins or connections.
   8. Install connections and tie-ins as shown on Drawings.

C. Pipe Joining:
   1. Heat fusion method.
   2. Perform in accordance with manufacturer’s instructions.

D. Connection from High Density Polyethylene Pipe (HPDE) to Ductile Iron Pipe (DIP).

1. Connections shall be made by one of the following unless approved by the City Engineer.
    a. Mechanical joint adaptors (fused to HDPE pipe) approved by the City Engineer.
    b. Anti-thrust restraint glands with stainless steel pipe stiffeners.
        1) Anti-thrust restrain glands shall be Megalug by Ebaa Iron, or approved equal.
        2) Pipe stiffeners shall be Model CPS as manufactured by Cascade Waterworks Mfg., or approved equal.

E. Tracer Wire Installation:
1. Install tracer wire along the axis of all HDPE pipe.
2. Ensure tracer wire remains intact throughout the entire installation process.
3. See Section 2.05 for tracer wire product information.
4. Except for approved splice connections and repairs, install in continuous manner.
5. Install tracer wire parallel with and above centerline axis of pipe.
6. Do not spiral wrap or tape tracer wired to pipe.
7. Do not install under service saddles.

F. Test Station Installation
1. A tracer wire test station shall be installed at each boring pit location (including gate valve and/or hydrant locations and air release manholes).
2. Each test station shall be installed according to manufacture recommendations in a location approved by the engineer.

3.04 RESTORATION

A. Backfill pits in accordance with Section 31 23 00.

B. Restore Work areas to original condition.

3.05 FIELD QUALITY CONTROL

A. Pressure test all material and joints in accordance with Section 33 11 00 prior to installation.

B. Conductivity (Tracer Wire) Testing:
1. All tracer wire for HDPE shall be tested for continuity after the installation is completed Test continuity of conduction in the presence of the Engineer.
2. Connect signal generator at wire termini and trace signal throughout the installation.
3. Locate and repair all breaks in conductivity.
4. Failure and Correction
    a. Failure of a segment shall be determined by current measurements that are insufficient, intermittent, or unsteady.
    b. Isolate and correct defective contact points as indicated by failed tests.
    c. Retest failed segments after correction.

C. Perform drill fluid testing at a rate of one test per 2-hour interval during drilling and pullback.
1. Fluid Density:
    a. Measure with a mud balance.
    b. Report results in pounds per gallon.
2. Marsh Funnel Viscosity:
    a. Measure with a marsh funnel and record time to fill a 1-quart container.
    b. Report results in seconds per quart.
3. Sand Content:
    a. Determine volume of solids larger than the No. 200 sieve.
    b. Measure with a sand content kit.
    c. Report in percent of total volume.
4. pH:
    a. Measure and report pH using pH strips or a pH meter.

D. Perform additional drill fluid tests at a rate of 2 per day in the event of a drill hole collapse, the product pipe or drill head becomes stuck, or the hole is abandoned.

1. Gel Strength:
    a. Measure and calculate using a shearometer by dropping a 5-gram cylinder through a calibrated measuring device.
    b. Report in pounds per 100 square feet.
2. Filtrate and Filter Cake:
    a. Measure with a filter press.
    b. Report filtrate in cubic centimeters.
    c. Report filter cake in 1/32 of an inch.

E. Installation Tolerances:
1. Inclination:
    a. Accuracy: Plus/minus 0.05 degrees.
    b. Range: Plus/minus 90 degrees.
    c. Repeatability: Plus/minus 0.02 degrees.
2. Roll:
    a. Accuracy: Plus/minus 0.1 degree.
    b. Range: Plus/minus 0 to 360 degrees.
3. Azimuth:
    a. Repeatability: Plus/minus 0.1 degree.
    b. Range: Plus/minus 0 to 360 degrees.

3.06 DISINFECTION

A. Disinfect all newly installed water mains, appurtenances and services in accordance with Section 33 11 00.

3.07 MATERIAL DISPOSAL

A. Excess drilling fluid and spoil will become property of the Contractor for transport and disposal.

B. Do not discharge excess fluid and spoils into sewer systems or natural waterways.

C. Remove and dispose of drilling fluid that surfaces through fracturing.

END OF SECTION

SECTION 33 05 28

CONDUIT FOR PRIVATE UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Placement of PVC and ductile iron pipe conduits to be used at a later date by private utility contractors, developers, and the City of Hudson.

B. Related Sections:
   1. Section 33 05 05 – Trenching and Backfilling
   2. Section 33 11 00 – Water Distribution Systems
   3. Section 33 31 00 – Sanitary Sewer Systems

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Conduit Crossings: Measurement shall be per linear feet of crossing, based on the number of conduits per crossing. For example, if a location is determined to require 3 conduits, the Contractor would be paid for the length of the crossing (not the total length of all 3 conduits) under the Bid Item for 3 conduits. Payment at the Unit Price will be considered compensation in full for the installation of the conduits as shown in the Drawings, including excavation, backfill, compaction, end cap, and steel fence posts, regardless of the number of conduits in the trench excavation:
      a. It should be noted that due to the estimation required for Drawing preparation, the quantities of private utility crossings actually constructed may vary significantly from those given in the Bid Form.
      b. The Engineer reserves the right to increase or decrease the conduit quantities with no change to the Contract Unit Price. No additional compensation will be considered or allowed for changes to the estimated quantities or for the deletion of any of these Bid Items in their entirety.
      c. For most crossings, the 4-Inch Diameter PVC conduit is of adequate size for the private utility companies to place their facilities. If a 6-Inch conduit is required, measurement shall be identical to that for the 4-Inch diameter conduits with payment made under a separate Bid Item for 6-Inch Conduit.
   2. Irrigation Conduit Crossing: Measurement and Payment shall be made based on the linear foot of pipe installed, including 4-inch ductile iron pipe, trench, excavation, backfill, and steel fence posts markers.
   3. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 SEQUENCING AND SCHEDULING

A. Install conduit after the public utilities are completed, after the street sub-grade and granular backfill work is complete, and prior to the dense graded base improvements.

B. Bid Items are included in the Bid Form for crossings consisting of single or multiple conduits, based on estimates made at the time of Drawing preparation.

C. At the pre-construction meeting, a final plan of proposed crossings will be presented to the Contractor based on the actual needs of each private utility company. Irrigation crossings will be provided by the Developer. The location of the City's conduit will also be identified on this final plan.

PART 2 PRODUCTS

2.01 MATERIALS

A. Conduit: 4-inch and 6-inch diameter PVC, Schedule 40 conforming to Section 33 31 00.

B. Markers: Steel fence posts, 5 feet in length.

C. Irrigation Conduit: 4-inch diameter ductile iron pipe conforming to Section 33 11 00.

PART 3 EXECUTION

3.01 GENERAL

A. Excavation and backfill to conform to Section 33 05 05.

3.02 INSTALLATION

A. Conduit Trenching:
   1. In general, underground conduit shall be installed by trenching.
   2. The location of each crossing will be staked by the Engineer at the time of construction to assist the Contractor in proper placement of conduits both horizontal and vertical locations.
   3. Install conduit as shown on Detail STR-25. Mark ends of crossing locations with steel fence posts. One post required at each end of a crossing, regardless of number of conduits within that crossing.
   4. Trenches for the crossings shall be backfilled and compacted to the same standards as the water and sewer utility trenches.
   5. Excess excavated material shall be removed and disposed of off the Site.
   6. Irrigation conduits shall be installed four feet below the design street grade, and shall extend four feet beyond the back of curb on both sides of the street, or as directed by Engineer.

3.03 FIELD QUALITY CONTROL

A. The Engineer reserves the right to reject any material or workmanship not in accordance with the Specifications either before or after installation.

B. After trenches are excavated and conduit is placed, the Engineer shall be notified so that an inspection may be made before backfilling.

C. All trench backfill shall be compacted by mechanical means and by Standard Compaction Method.

END OF SECTION

SECTION 33 11 00

WATER DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Water main pipe and fittings.
   2. Valves and boxes.
   3. Hydrants.
   4. Services.
   5. Insulation.

B. Related Sections:
   1. Section 31 23 33 - Trench Excavation and Backfill
   2. Section 33 05 50 - Surface Facility Restoration
   3. Section 33 05 20 – Horizontal Directional Drilling (HDD) Pipe Installation

C. Method of Measurement:
   1. Water Main:
      a. Measure by distance in linear feet.
      b. Measure along pipe axis with no deduction for fittings or valves.
      c. Measure in the horizontal plane unless pipe grade exceeds 15 percent.
   2. Fittings:
      a. Measure by weight in pounds.
      b. Basis of Weight:
         1) Fittings: Meet AWWA C153.
         2) Exclude weights of glands, gaskets, rods, bolts, and other accessories.
   3. Valves and Boxes: Measure valve and box of each size and type as a unit.
   4. Hydrants:
      a. Measure hydrants of each size and type as a unit.
      b. Unit includes installation of hydrant, base, blocking, and crushed rock.
   5. Corporation Stops: Measure corporation stops of each size and type as a unit.
   6. Curb Stops and Boxes: Measure curb stops and boxes of each size and type as a unit.
   7. Service Pipe:
      a. Measure by distance in linear feet.
      b. Measure each size separately.
      c. Measure from center of water main to center of curb stop plus 1-foot for slack.
   8. Insulation: Measure by quantity of 2-inch by 4-foot by 8-foot sheets.

D. Basis of Payment:
   1. Payment for acceptable quantities of water main and appurtenances shall be at the Contract Unit Price as listed on the Bid Form. All associated Work items shall be considered incidental.

1.02 REFERENCES

A. ASTM:
   1. A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings
   2. A307 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
   3. A536 - Ductile Iron Castings
   4. A563 - Carbon and Alloy Steel Nuts
   5. B88 - Seamless Copper Water Tube
   6. B152 - Copper Sheet, Strip, Plate, Rolled Bar
   7. D429 - Tests for Rubber Adhesion to Rigid Surfaces
   8. D2842 - Test for Water Absorption of Rigid Cellular Materials

9. D1248 - Polyethylene Plastics Extrusion Materials for Wire and Cable

B. AWWA:
1. C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
2. C116 - Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
3. C150 - Thickness Design of Ductile Iron Pipe
4. C151 - Ductile-Iron Pipe, Centrifugally Cast for Water or other Liquids
5. C153 - Ductile-Iron Compact Fittings for Water Service
6. C502 - Dry-Barrel Fire Hydrants
7. C504 - Rubber-Seated Butterfly Valves
8. C509 - Resilient-Seated Gate Valves for Water Supply Service
9. C515 - Reduced-Wall, Resilient-Seated Gate Valves, for Water Supply Service
10. C600 - Installation of Ductile Iron Water Mains and their Appurtenances
11. C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

C. NSF/ANSI 61: Drinking Water System Components

1.03 DEFINITIONS

A. Utility: Refers to the City of Hudson Public Utilities

1.04 SUBMITTALS

A. Submit Certificate of Compliance for products listed under Article 1.04.

B. Submit proposed method of joint conductivity.

C. Submit proposed method and type of thrust restraint.

1.05 QUALITY ASSURANCE

A. All work on water system infrastructure shall be witnessed by Utility personnel, Engineer or authorized Resident Project Representative before acceptance by the Utility.

B. Developer's Responsibility - Furnish Utility with:
1. "As-Built" drawings in the following formats within 60 days of acceptance by the Utility:
   a. Hard copy.
   b. Electronic PDF scaled for full-size printing.
   c. Electronic suitable for use with GIS (i.e. ArcGIS shapefile).
2. Copies of recorded easements.
3. Copies of conductivity tests, pressure tests, and bacteriological confirmation sampling results.
4. Statement saying construction was accomplished according to these approved specifications.
5. Payment for costs of inspections by the City.
6. Payment for costs (i.e., labor, materials, transportation, and laboratory analyses) attributed to the proper methods and procedures involved with abandonment, installation, valving, flushing, conductivity tests, pressure tests, bacteriological sampling, and punch lists.

C. Provide Certificates of Compliance from the manufacturer certifying that the following products meet the respective requirements listed in Article 1.02:
1. Water Main Pipe
2. Fittings
3. Valves
4. Hydrants

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inspection:
1. Inspect all pipe and products during the unloading process.

2. Notify Utility and Engineer of any cracked, flawed or otherwise defective products.
3. Remove all products found to be defective by the Utility or Engineer from the Site.

B. Handling and Storage: Handling and storage of products shall be in accordance with Section 2.2 of AWWA C600.

PART 2 PRODUCTS

2.01 COUNTRY OF ORIGIN

A. All materials must be manufactured in the United States unless approved by Utility.

2.02 WATER MAIN PIPE

A. Ductile Iron: AWWA C151.

B. Cement-Mortar Lining: AWWA C104.

C. Thickness Class: 52 unless otherwise noted.

D. Joints:
1. Tyton push joint, or approved equal.
2. Gasket joint restraint system shall be installed for Tyton push joints in all situations that require thrust restraint. At a minimum, this shall include three full-length pipe joints prior to dead ends; three full-length pipe joints upstream and downstream of valves, tees, and fittings; and all joints in poor foundation areas and grades 10% or greater as determined a necessity by the City.
   a. Field Lok 350 by U.S. Pipe of Birmingham, AL
   b. Or approved equal
3. Anti-thrust restraint glands on all mechanical joints.
   a. Megalug by Ebaa Iron of Eastland, TX

E. Joint Conductivity:
1. Conductive gaskets as manufactured by American Ductile Iron Pipe Co.
2. Field Application Methods:
   a. Burndy - Thermoweld by Burndy Corp., Norwalk, Connecticut.
   b. Cadweld by Erico Products Co., Cleveland, Ohio.
3. Copper Jumpers:
   a. Minimum 1/16-inch by 1/2-inch wide flat copper strip.
   b. Annealed round copper wire conforming to ASTM B152, Type DHP.
4. Nuts and Bolts: Silicon Bronze.

2.03 FITTINGS

A. Ductile Iron:
1. AWWA C151 for 3-inch to 16-inch pipe.
2. AWWA C110 for larger than 16-inch pipe.

B. Protective Fusion-Bonded Epoxy Coatings: AWWA C116.

C. Mechanical Joints:
1. Tyton push joint or approved equal.
2. Gasket joint restrain syste shall be installed on all Tyton push joints.
   a. Field Lok 350 by U.S. Pipe of Birmingham, AL.
3. Anti-thrust restraint glands on all mechanical joints.
   a. Megalug by Ebaa Iron of Eastland, TX

D. Solid D.I. sleeves shall be a minimum 12 inches long.

E. Nuts and Bolts: Cor-Blue or approved equal.

2.04 VALVES AND BOXES

A. Gate Valves:
   1. Waterous AFC 2500 compact D.I. or approved equal.
   2. Resilient Seated: AWWA C515.
   3. Working Pressure: 250 psi.
   4. Ends:
      a. Mechanical Joint: Tyton push on joint with Cor-Blue bolts and nuts,
      b. Alpha Restrained Joint by American Flow Control,
      c. Approved equal.
   5. Operating Stem: Non-rising with O-ring seals.
   6. Operating Nut: 2-inch Square, Open Left.
   7. Markings to be cast on the bonnet or body:
      a. Open indicating arrow.
      b. Manufacturer's name.
      c. Pressure rating.
      d. Year of manufacture.
      e. Size.
   8. Any valve greater than 9.5 foot bury depth shall be provided with approved valve box operating nut extensions.
   9. Valves 16 inches or larger shall be provided with appropriate gearbox and/or 6-inch valved bypass.

B. Butterfly Valves:
   1. Shall be used on all pipe greater than 30 inches in diameter.
   2. Rubber Seated: AWWA C504.
   3. Class: 150B.
   4. Body Type: Mechanical - Joint-End with anti-restraint gland.
   5. Disc:
      a. 316 stainless steel edge
      b. 3-inch thru 24-inch: ASTM A126 Class B Cast Iron
      c. 30-inch and larger: ASTM A536 Ductile Iron
   6. Seat:
      a. 3-inch through 20-inch: Bond to body per ASTM D429, Method B.
      b. 24-inch and larger: Retain in body without use of metal retainers.
   7. Operator:
      a. Traveling nut actuator
      b. Open left.
   8. Operating Stem: Non-rising with O-ring seals.
   9. Operating Nut: 2-inch square.
   10. Markings to be cast on the body:
      a. Open indicating arrow.
      b. Manufacturer's name.
      c. Class.
      d. Year of manufacture.
      e. Size.

C. Boxes:
   1. Cast Iron, 5-1/4-inch shaft.
   2. Vertical, 3 piece, Buffalo type. Tyler 6860 Series Style "F" or approved equal with two bottom length sections.
   3. Box length adjustable from 63 inches to 84 inches so as to maintain 7.5 feet minimum pipe cover.
   4. Adjustable to 6 inches up or down from finished grade.
   5. No "threaded insert" sections allowed. Tyler 2 to 4 inch riser with approved sealant are acceptable.
   6. Valve boxes outside the roadway (such as right-of-ways and easements) shall be marked with U-style steel fence post 4 feet above grade painted blue.

7. All valves shall include a Gate Valve Adaptor as manufactured by Adaptor Inc. or approved equal. The adaptor shall be constructed of ¼" steel with UP polyurethane coating and ¾" rubber gasket attached to the adaptor.

2.05 HYDRANTS

A. Dry Barrel: AWWA C502.

B. Waterous Pacer WB67-250 all D.I. or approved equal.

C. Hose Connections: 2 each at 2-1/2-inch diameter.

D. Steamer Connection: 1 each at 4-1/2-inch diameter.

E. Threads: National Standard.

F. Operating Stem: Two-piece Open Left with O-ring Seals.

G. Cap Nuts: Pentagon (1½-inch F.T.P.) with weather shield.

H. Traffic flange (with 16-inch break-off).

I. Hub: Epoxy coated mechanical joint with ASTM F593 and F594 type 304 Stainless Steel bolts and nuts.
   1. 6-inch.
   2. Gasket joint restraint system shall be installed on all Tyton push joints.
      a. Field Lok 350 by U.S. Pipe of Birmingham, AL.
      b. Or approved equal.
   3. Anti-thrust restraint glands on all mechanical joints.
      a. Megalug by Ebaa Iron of Eastland, TX.
      b. Or approved equal
   4. All joints in a hydrant lead shall be restrained to the tee, and all leads shall be valved. 8" mechanical joint may be required as directed by engineer.

J. Main Valve Opening: 5¼-inch diameter.

K. Barrel Diameter: 7-inch.

L. Drain to operate only when hydrant is closed.
   1. Where groundwater is present, the hydrant shall not have weep holes in the brass valve seat; and a "Pump After Use" tag must be affixed to the hydrant nozzle section. Factory tapped and plugged drain holes are allowed.

M. Bury Depth: 8.5 feet (ground line groove to bottom of hub).

N. Color: Red.

O. Provide permanent markings which indicate:
   1. Manufacturer's name.
   2. Year of manufacture.
   3. Bury depth.

P. Five foot E-Z Guide Safety Marker w/red and white reflective markings and spring base or approved equal.

Q. Accessories
   1. Where required, extensions shall not be greater than 42-inch long.
      a. Hydrant extension kits shall be manufactured by Waterous / AFC of Saint Paul, MN.
   2. Food grade oil must be replaced in reservoir.

3. Break-off rod coupling to be moved to proper location.
4. Hydrant shall be operated and pressurized for proper operation and visual inspection for leaks.
5. Bury depth extension tab reinstalled.
6. Extension size tab installed.

2.06 SERVICE PIPE

A. Copper: ASTM B88.

B. Type: K, Soft: 1-inch to 1½-inch only. (2-inch services are not allowed)

C. Ductile Iron - ANSI/AWWA C151/A21.51.
   1. Cement - Mortar Lined - ANSI/AWWA C104/A21.4.
   2. Thickness Class 52.

2.07 CORPORATION STOPS

A. Type: Mueller B-25008, or equal.
   1. Inlet: AWWA taper thread.
   2. Outlet:
      a. Conductive compression connection.
      b. Compression joint.
   3. All fittings shall conform to ANSI/AWWA Standard C800, latest revision.
   4. All brass components in contact with potable water must be made from no-lead brass. Brass alloys not listed in ANSI/AWWA C800 Paragraph 4.1.2 are not approved. Brass saddles shall be made from CDA/UNS C83600.
   5. All service fittings shall be certified as suitable for contact with drinking water by an ANSI accredited organization accordance with ANSI/NSF Standard 61, Drinking Water Systems Components – Health Effects.
   6. All fittings shall be stamped or embossed with a mark or name indicating that the product is manufactured from the low-lead alloy as specified in paragraph 4.

2.08 CURB STOPS AND BOXES

A. Curb Stop (Valve)
   1. Type: Mueller 300 Ball B-25154, B-25155 or approved equal.
   2. Inlet: Copper Service Thread compression joint.
   3. Outlet: Copper Service Thread compression joint.
      a. There shall be 15 feet of copper service pipe installed beyond the curb stop with the copper end flared and installed with flare nut and plug. End shall be marked with 4-inch x 4-inch timber to 12 inches above grade. (See Detail Plate SER-5)
   4. All fittings shall conform to ANSI/AWWA Standard C800, latest revision.
   5. All brass components in contact with potable water must be made from no-lead brass. Brass alloys not listed in ANSI/AWWA C800 Paragraph 4.1.2 are not approved. Brass saddles shall be made from CDA/UNS C83600.
   6. All service fittings shall be certified as suitable for contact with drinking water by an ANSI accredited organization accordance with ANSI/NSF Standard 61, Drinking Water Systems Components – Health Effects.
   7. All fittings shall be stamped or embossed with a mark or name indicating that the product is manufactured from the no-lead alloy as specified in paragraph 5.

B. Box
   1. Type: Minneapolis Pattern, Extension.
   2. Length: 7.0 feet (78 inches) to 8.0 feet (90 inches) adjustable.
   3. Installed to be adjustable to 6 inches up or down from finished grade.
   4. 1 inch services - 1¼ inch upper section box Mueller H-10300 or approved equal.
   5. 1½ services - 1½ inch upper section Box Mueller H-10302, or approved equal.
   6. Marked w/T-style steel fence post 4 feet above grade painted blue in boulevard ROW (see Detail Plate WAT-11).

2.09 INSULATION

A. Rigid, extruded polystyrene board insulation.

B. Thermal Resistance (R): 5.0.

C. Thickness: 2-inch.

D. Board Size: 48-inch by 96-inch.

E. Compressive Strength: Minimum 25 psi.

F. Water Absorption in accordance with ASTM D2842: 0.1 percent by volume, maximum.

G. Edges: Square.

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. All construction shall be in accordance with Hudson Standard Detail Plates.

B. Connection to Existing System:
   1. Pressure Tap:
      a. Install tap in location shown on the Drawings.
      b. Use approved tapping machine designed specifically for tapping under pressure.
      c. Install tapping sleeve and gate valve as part of assembly. Tapping sleeve shall be all-stainless full circle Smith-Blair 662 Series or approved equal for all C.I. and D.I. applications.
      d. All tapping sleeve and flange bolts and nuts shall be stainless steel.
      e. Install blocking as required.
      f. Install conductivity straps on existing and new main and fittings.
      g. Provide conductor from connection to above-grade location to allow conductivity testing to be completed.
      h. Disinfect all fittings.
   2. Cut-In Connection:
      a. Isolate segment of pipe to be cut and drain water from the line.
      b. Connect tee and sleeve (minimum 12-inch D.I. sleeve) assembly to pipe ends.
      c. Install blocking and thrust restraint as required.
      d. Install conductivity straps on existing and new main and fittings.
      e. Interruption of Service.
         1) Customer notification by contractor 48 hours previous to interruption.
         2) Utility must be notified 48 hours previous to scheduled operation of valves.
         3) Valves to be operated by Utility personnel only.
      f. Provide conductor from connection to above-grade location to allow conductivity testing to be completed.
      g. Disinfect all fittings.
   3. Connect to Inplace Fitting:
      a. Isolate segment of inplace pipe and remove blocking as required.
      b. Remove plug and drain water from the line.
      c. Install blocking and thrust restraint as required.
      d. Install conductivity straps on existing and new main and fittings.
      e. If joints cannot be pressure tested, visual inspection of joints at static pressure must be conducted prior to placing backfill.
      f. Interruption of Service.
         1) Customer notification by contractor 48 hours previous to interruption.
         2) Utility must be notified 48 hours previous to scheduled operation of valves.
         3) Valves to be operated by Utility personnel only.

g. Provide conductor from connection to above-grade location to allow conductivity testing to be completed.
h. Disinfect all fittings.

C. Pipe Installation:
1. Install pipe at the alignment and grade shown on the drawings.
2. Provide 7.5 feet of cover over the pipe. Any cover less than 7.5 feet or more than 8.5 feet shall be approved by the City.
a. Pipes shall be insulated with closed cell insulation to maintain 7.5 feet of cover (1 inch of closed cell insulation equals 1 foot of soil) or as approved by the Utility in all situations that apply to prevent freezing.
3. Install appurtenances in the locations shown on the drawings.
4. Remove all dirt and foreign material from the pipe interior prior to installation of the pipe. After installation of each pipe, the gasket shall be examined for proper seating.
5. See Section 33 05 05 for pipe foundation and backfill procedures.
6. See Section 33 05 05 in case of conflicts with existing pipes.
7. Absolutely NO ROCKS within 2 feet of pipe zones.
8. All storm sewer conflicts or intersections between the water and storm shall be insulated as approved by the City to equate to 7.5 feet of cover (1 inch closed cell insulation = 1 foot of soil).
9. Any soil inconsistencies as determined by the City in the pipe foundation area shall be bedded with approved granular within 1 foot of pipe zone.
10. All other utility construction such as natural gas, power, telephone, and cable TV, etc. in right-of-ways and easements (minimum 30 foot) shall be coordinated so to maintain 10 foot horizontal distance from water lines.
11. Easements shall be minimum 30 feet wide with water lines constructed 10 feet from one side and 20 feet from other side.
12. The City must approve any cuts or fills in easements.
13. Dead-ends shall be kept to an absolute minimum.
14. All dead-end services larger than 1½ inches shall be installed with minimum 1 inch corp., stop, stand, and copper pigtail to facilitate testing and flushing.
15. All water main dead-ends shall be installed with a hydrant to facilitate flushing.
16. All water mains shall be flushed at a minimum velocity of 10 feet per second.
17. All grades (10% or greater) shall be analyzed by the City to determine the necessity of installing thrust restraint.

D. Valve and Box Installation:
1. Verify that subgrade material is adequate to support valve assembly.
2. Install valves with stems vertical and plumb.
3. Install boxes plumb and centered over the valve nut.
4. Verify that box remains plumb and centered during backfill. This shall be verified by sliding the gate valve alignment tool up and down the valve box with no restrictions and centered on operating nut.
a. Gate valve alignment tool shall be Schedule 3034 – 4 1/4 –inch OS diameter thin wall PVC sewer pipe (furnished by the Utility, refer to Detail Plate WAT-10).
5. Adjust box cover to required grade. This will be accomplished so box is adjustable 6 inches up or down.
6. Valve boxes located in concrete shall be sleeved and adjusted ½ inch below grade.
7. Valve boxes located in asphalt shall be adjusted ½ inch below grade.
8. Any valve greater than 9½ foot bury shall be installed with an approved valve operating nut extension.
9. No “threaded insert” sections allowed. Tyler 2 to 4 inch risers with approved sealant are acceptable.
10. Valve boxes outside the roadway (such as right-of-ways and easements) shall be marked w/U-style steel fence post 4 feet above grade painted blue.
11. Valve boxes shall not be located in stormwater features such as rain gardens.

E. Hydrant Installation:
1. All joints in a hydrant lead shall be restrained to the tee, and all leads shall be valved.
2. Verify that subgrade material is adequate to support hydrant.

3. All storm sewer conflicts or intersections between the water and storm shall be insulated as approved by the City to equate to 7.5 feet of cover (1 inch closed cell insulation = 1 foot of soil).
4. Place concrete block, washed drain rock and 4-mil polyethylene in accordance with Hudson Standard Plates (WAT-2).
5. Install and maintain hydrant in a plumb position.
6. Where groundwater is present, the hydrant shall not have weep holes in the brass valve seat; and a “Pump After Use” tag must be affixed to the hydrant nozzle section. Only factory made drain holes will be allowed.
7. Hydrant ground flange shall be 3 to 6 inches above finished grade.
8. Install marker on back nozzle section bolt opposite bury depth tag.
9. Provide permanent markings that indicate:
    a. Manufacturer’s name.
    b. Year of manufacture.
    c. Bury depth.
10. All hydrants shall be cleaned properly and finish coated upon completion of utility construction to the original equipment manufacturers (OEM) specifications.
    a. Use power tools to clean all rust and other contamination from the hydrant body.
    b. Apply two coats of touch up paint where prime coating has been damaged.
    c. Paint shall meet the original equipment manufacturers (OEM) specifications.
11. Hydrants shall be marked with approved ”Out of Service” tags when installed.
12. Extensions
    a. Install adjustment fitting on all fire hydrants.
    b. Where required, extensions shall not be greater than 42-inch long.
    c. Waterous food grade oil must be replaced in reservoir.
    d. Break-off rod coupling to be moved to proper location.
    e. Hydrant shall be operated and pressurized for proper operation and visual inspection for leaks.
    f. Bury depth extension Tab reinstalled.
    g. Extension size tab shall be installed.
    h. The Utility must be notified 24 hours in advance and witness all hydrant maintenance. Failure to notify Utility will result in non-acceptance.

F. Joint Conductivity:
1. Provide electrical bond across all joints between pipes and appurtenances.
2. Epoxy coated fittings, valves, and hydrants and stainless steel appurtenances shall have an electrical bond from pipe to pipe across the entire appurtenance.
3. Install copper jumpers by either shop or field applications. (Minimum 1/16-inch by ¾-inch)
4. Fasten multiple jumper strips with silicon bronze bolts and nuts.
5. Welding:
    a. Grind surfaces to be welded to remove coating and oxide and to provide clean metal surface.
    b. Use metallic-arc process for stop applications.
    c. Use exothermic process for field applications.
        1) Utilize Cadweld system by Erico International of Solon, OH or approved equal.
    d. Refinish welded areas, and areas impacted by grinding, with anticorrosive protective coating after connection is made and welded area has cooled to the touch.
        1) Gunk T1617R Tite-Seal Rubberized Auto Body Undercoating or approved equal.

G. Thrust Restraint:
1. Submit method and type to the City for approval, minimum of 5 working days prior to starting construction.
2. Install in accordance with “Thrust Restraint Design for Ductile Iron Pipe”, 6th Ed., Ductile Iron Pipe Research Association.
3. Install thrust restraints at all bends, tees, plugs, sleeves, valves and hydrants.
    a. At a minimum, this shall include three full length pipe joints prior to dead ends; three full length pipe joints upstream and downstream of valves, tees, and fittings; and all joints in poor foundation areas and grades 10% or greater as determined to be a necessity by the City.
    b. Fill areas shall require thrust restraint as determined by the City.

4. Gasket joint restraint system shall be installed on all Tyton push joints.
5. Anti-thrust restraint glands on all mechanical joints.
6. All Tyton push joints with gasket joint restraint system shall be marked with plastic tape that indicates “Restrained Joint.” If plastic tape is unavailable, the top of hub and spigot shall be painted “Blaze Orange” with the initials “R-J.”
7. Concrete Blocking
    a. Concrete blocking for thrust restraint is not allowed unless approved by City.
    b. Place between the fitting and undisturbed trench wall with fabric between concrete and fitting to allow no concrete to be in contact with bolts, fittings, flanges, and pipe.
    c. Minimum thickness: 12 inches.
    d. Minimum area in square feet shall be in accordance with the following:

Pipe	Tee or Plug	1/4 Bend	1/32 and 1/8 Bend	1/16 Bend
6-inch	2.9	3.1	1.6	0.8
8-inch	3.7	5.3	2.9	1.4
10-inch	5.7	8.1	4.4	2.2
12-inch	8.1	13.4	6.6	3.2
16-inch	15.1	21.4	11.6	5.9
20-inch	23.2	30.2	18.1	9.3
24-inch	33.6	48.5	26.1	13.3

    e. Size blocking based on the larger main.
    f. Verify that bolts are accessible after concrete is poured.

H. Service Installation:
1. Corporation Stops:
    a. Provide watertight connection with approved tapping machine.
    b. Install in upper quadrant of water main pipe under pressure.
    c. Place a double wrap of Teflon tape around the threads prior to installation.
    d. 1¼ and 1½-inch taps (and any size taps in 4" DIP) shall be installed w/double strap tapping service saddle Ford Style F202, (W/AWWA CC Thread) or approved equal.
    e. No taps allowed in hydrant leads.
    f. Interruption of Service.
        1) Customer notification by contractor 48 hours previous to interruption.
        2) Utility must be notified 48 hours prior to scheduled operation of valves.
        3) Valves to be operated by Utility personnel only.
2. Copper Service Pipe:
    a. Install pipe between corporation stop and curb stop with no joints or unions.
    b. Bury Depth: 7.5 feet.
    c. Where 7.5 feet of cover cannot be provided, as approved by City, services shall be insulated with closed cell insulation to maintain the equivalent insulation value of 7.5 feet of cover.
        1) 1 inch of closed cell insulation equals 1 foot of soil.
        2) Or as approved by the City.
    d. Provide minimum 1-foot of slack in the pipe to allow for settlement and movement.
    e. There shall be 15 feet of copper service pipe installed at minimum cover beyond the curb stop with a pigtail with cap extended above grade for flushing. End shall be marked with 4-inch x 4-inch timber to 12 inches above grade. (See Detail Plate SER-5)
    f. Following testing and flushing, pump the service pigtail dry and cap with compression fitting.
    g. All storm sewer conflicts or intersections between the water and storm shall be insulated as approved by the City.
    h. All copper connections shall be reamed and sized by approved sizing tool and any approved joints shall be installed with Mueller H-15400, H-15403, or approved equal.
3. Curb Stop and Box:
    a. Install at the location shown on the Drawings.
    b. Verify that subgrade material is adequate to support the curb box assembly.
    c. Install boxes plumb and centered over the tee head.
    d. Verify that box remains plumb and properly aligned during backfill.
    e. Adjust box cover to required grade.

f. Key all curb stops after backfill to ensure proper operation.
g. Any curb box greater than 9-½ foot bury shall be installed with an approved curb stop operating extension.
h. Curb stop boxes shall not be located in stormwater features such as rain gardens.

4. Ductile Iron Service Pipe:
   a. Bury Depth: 7.5 feet - any cover less than 7.5 feet or greater than 8.5 feet shall be approved by the City.
   b. Where 7.5 feet of cover cannot be provided, as approved by City, services shall be insulated with closed cell insulation to maintain the equivalent insulation value of 7.5 feet of cover.
      1) 1 inch of closed cell insulation equals 1 foot of soil.
      2) Or as approved by the City.
   c. Ductile iron services will be valved within 3 feet to 5 feet of the main (unless wet tap), and all joints in the service line shall be restrained. These services shall have conductivity and be included in the conductivity test.
   d. Ductile iron services (stub to lot) shall be installed with minimum 1-inch corporation stop, stand, and copper pigtail to facilitate testing, voiding of air, and flushing. The end of the ductile iron service shall be marked with 4-inch x 4-inch timber to 48 inches above grade.
   e. Ductile iron services (main to building, tapped or connected) shall be flushed clean and voided of air.
   f. Full pipe flush at a minimum of 10 feet per second velocity is required.
   g. Pressure test, conductivity test, and bacteria test shall be completed.
   h. After installation of each pipe, the gasket shall be examined for proper seating.
   i. All storm sewer conflicts or intersections between the water and storm sewer shall be insulated as approved by the City.

5. Fire Sprinkler Services: Where fire sprinkling is required, separate fire and domestic service lines shall be installed from the main into the building. Joint fire/domestic water services are not allowed.

3.02 FIELD QUALITY CONTROL

A. Complete the following tests on trench backfill:
   1. Compaction: Owner shall employ an independent testing laboratory to perform, at a minimum the following tests in locations determined by the Engineer:
      1) Water Main: 1 density test for every 300 feet of trench.
      2) Water Services: 1 density test for every 4 services installed.

B. Perform the following tests upon completion of the system and prior to being placed into service. Each test shall be witnessed by authorized City personnel.

   1. Prior to initiating test sequence, the disinfection process (as noted later in this Section) must be completed through the flushing step.

   2. Test Sequence.

      a. Tests shall be conducted in the following order:
         1) Conductivity.
         2) Bacteriological.
         3) Pressure.
      b. Electrical Conductivity Test:
         1) Perform electrical conductivity test to verify that electrical thawing of the system may be accomplished by Utility.
         2) Test Parameters:
            a) Perform test prior to pressure testing.
            b) Perform test after back-filling is completed and while line is at normal operating pressure.
            c) Test Current: 350 amperes DC plus or minus 10 percent.
            d) Test Duration: 5 minutes.
            e) Test between hydrants in segments of convenient length.
         3) Procedures:

a) Furnish DC current source, cable and all required equipment of adequate capacity to accomplish the test.
b) Clamp cables to hydrant flange bolts.
c) Conduct test with hydrant in the open position and caps on.
d) Measure current continuously throughout the test with a DC ammeter hooked on a cable lead.
e) Start test at minimum current level and increase to test level.
f) Drain hydrant and tighten caps after test.

4) Failure and Correction:
a) Failure of a segment shall be determined by current measurements that are insufficient, intermittent or unsteady.
b) Isolate and correct defective contact points as indicated by failed tests.
c) Retest failed segments after correction.

c. Pressure Test:
1) Test shall be accomplished through corporation stop.
2) All air shall be voided from the system.
3) Perform pressure and leakage test in accordance with AWWA C600.
4) Test Pressure: 150 psi.
5) Test Duration: 2 hours.
6) Gage Requirements:
a) Size: 4-1/2-inch dial.
b) Range: 0 to 200 psi.
c) Gradation: 2 psi.
d) Accuracy: 1/2 percent.
7) Do not allow pressure to vary more than 3 psi during the test.
8) Do not allow pressure to vary more than 2 psi during the last hour of the test.
9) Pressure drop exceeding 3 psi shall be considered a failure.
10) Test shall be repeated until the pressure drop is within the 3 psi limit including retesting following corrective measures.
11) The total water main system installed shall be tested for pressure requirements in sections and sequence as approved by the City.
12) Pressure test apparatus, hose, barrels, and water shall be safe for potable water, disinfected by the contractor and approved by authorized City representative prior to starting test.

d. Testing Water Services:
1) Perform separate pressure and leakage test on the services with the corporation stops open.
2) Test Pressure: 100 psi.
3) Duration: 2 hours.
4) Allowable Pressure Drop: None.
5) At Contractor's option, service testing may be done concurrent with main testing.

3. Before the system is placed into service, all valve boxes, curb stop boxes, and hydrants shall be accessible, adjusted to grade, operational, and marked according to these specifications.

3.03 DISINFECTION

A. Disinfect all newly installed water mains, appurtenances and services in accordance with AWWA C651.

B. Utility shall be notified 48 hours before any operation of valves, hydrants, and sampling.
1. Valves to be operated by Utility personnel only.

C. Fill water main slowly with appropriate hydrants and other accessible locations, usually locations at the highest elevation, open to void the system of as much air as possible.

D. Tablet or Continuous Feed Method:
1. Granular calcium hypochloride shall be used.
2. Hold chlorine solution in pipe for a minimum period of 24 hours and a maximum of 48 hours.

a. Initial dosage: 50 ppm minimum.
b. Residual dosage after hold period: 10 ppm minimum.

E. Flush system with a high velocity flush (ten feet per second) within 24 hours after disinfectant contact time is completed.

F. System shall be flushed after conductivity and pressure tests, but before bacteriological sampling. Chlorine residuals shall match existing system residuals in the area.

G. Sampling and Testing:
1. Bacteriological water samples (at least one) shall be taken a minimum of 24 hours after the flush at locations to be determined by the Utility. A coliform test will be performed on each sample.
   a. Utility personnel will furnish the lab form and sample bottle, take the sample, and deliver to the lab.
2. Each sample set shall include:
   a. One sample for every 1,000 feet of main.
   b. One sample at each dead-end less than 1,000 feet in length.
   c. Ensure that 1 sample is obtained from each branch of main.
   d. Minimum samples required: 2
3. Perform coliform tests on each sample.
4. Rechlorinate as approved by the Utility if any sample tests positive for coliform.
5. For developer projects: all costs associated with testing will be borne by the Developer.

END OF SECTION

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SECTION 33 31 00

SANITARY SEWER SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Gravity sanitary sewer pipe.
   2. Sanitary manholes and appurtenances.
   3. Service connections.
   4. Service pipe.
   5. Riser pipe.

B. Related Sections:
   1. Section 33 05 05 - Trenching and Backfill
   2. Section 33 05 20 - Horizontal Directional Drilling (HDD) Pipe Installation
   3. Section 33 34 00 - Sewage Force Mains

C. Method of Measurement:
   1. Sewer Pipe:
      a. Measure by distance in linear feet.
      b. Measure along longitudinal axis from manhole centers with no deduction for fittings.
      c. Measure each pipe size, class, and depth zone separately.
   2. Manholes:
      a. Measure each size and type individually as a unit.
      b. Unit includes granular foundation, precast barrel with integral base and cone sections, steps, rings, frame, and cover to a depth of 8 feet.
      c. Measure depth from lowest invert to top of frame.
   3. Excess Manhole Depth:
      a. Measure by distance in linear feet.
      b. Measure total distance from lowest invert to top of frame less 8 feet.
   4. Manhole Drop Section:
      a. Measure by distance in linear feet.
      b. Measure from upper to lower pipe invert.
      c. Unit includes base extension, fittings, drop pipe, collar, and differential cost of special lateral pipe material.
   5. Manhole Connections:
      a. Measure connections to an existing manhole as a unit.
      b. Unit includes cutting and patching of manhole wall and base, and construction of a new invert.
   6. Manholes Over Existing Pipe:
      a. Measure each size and type individually as a unit.
      b. Unit includes granular foundation, precast barrel with integral base and cone sections, steps, rings, frame, and cover to a depth of 8 feet.
      c. Measure depth from lowest invert to top of frame.
   7. Sewer Connections:
      a. Measure connections to an existing sewer pipe as a unit.
      b. Unit includes labor equipment and materials required to make connection including removal/salvaging of existing plug.
   8. Service Connections: Measure fittings of each size and type as a unit.
   9. Service Wyes:
      a. Measure wyes of each size and type as a unit.
      b. Unit includes coring, support sleeves, mechanical joint restraint and all other labor, equipment and materials required for installation

10. Service Pipe:
    a. Measure by distance in linear feet of each size.
    b. Measure horizontally from end of riser fitting to end of pipe.
11. Riser Pipe:
    a. Measure by distance in vertical feet for each size.
    b. Measure vertically from center of the sewer main to end of last riser section.
12. Plug: Measure fittings of each size and type as a unit.
13. Manhole Protective Coating: Measure by the vertical foot of each size of manhole coated.

D. Basis of Payment:
1. Payment for acceptable quantities of sanitary sewer items shall be at the Contract Unit Price as listed on the Bid Form.
2. All associated Work items shall be considered incidental.
3. Maintaining sanitary sewer service during construction shall be considered incidental unless a separate bid item is included for bypass pumping.

1.02 REFERENCES

A. ANSI:
1. A21.4 - Standard for Cement - Mortar Lining for Ductile Iron Pipe and Fittings
2. A21.11 - Standard for Rubber - Gasket Joints for Ductile Iron Pressure Pipe and Fittings
3. A21.51 - Standard for Ductile Iron Pipe Centrifugally Cast
4. A21.53 - Standard for Ductile Iron Compact Fittings, 3-inch through 16-inch

B. ASTM:
1. A48 - Specification for Gray Iron Castings
2. A74 - Specification for Cast Iron Soil Pipe and Fittings
3. C76 - Specification for Reinforced Concrete Pipe
4. C361 - Specification for Reinforced Concrete Low Head Pressure Pipe
5. C425 - Specification for Compression Joints for VCP and Fittings
6. C478 - Specification for Precast Reinforced Concrete Manhole
7. C564 - Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
8. D2321 - Recommended Practice for Installation of Flexible Thermo-plastic Sewer Pipe
9. D3034 - Specification for PVC Sewer Pipe and Fittings
10. F477 - Elastomeric Seals for Joining Plastic Pipe
11. F714 - Specification for PE Sewer Pipe and Fittings

1.03 SUBMITTALS

A. Submit Shop Drawings for each manhole.

B. Quality Assurance/Control Submittals:
1. Submit Certificates of Compliance from manufacturers certifying that materials meet reference specifications listed in Article 1.02.
2. Submit record of service connections weekly to Engineer.

1.04 HANDLING AND DELIVERY OF MATERIALS

A. Inspect pipe and materials during unloading process and notify Engineer of cracked, flawed or otherwise defective material.

1.05 STAKING

A. Engineer shall provide necessary staking once for all Work under this Section. Re-staking shall be provided by the Engineer and charged to the Contractor.

1.06 MAINTAINING SEWER SYSTEM

A. Maintain flow in sanitary sewers on continuous basis while construction is underway.

B. Plug sewers with inflatable plug. Provide pumps, portable generators, hoses, and related items appurtenant to the Work.

C. Sewer service lines to individual users may be disconnected for a period not to exceed 4 hours.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

A. Provide the following:
   1. Reinforced Concrete:
      a. Class as noted on plans R-4 (Round O-Ring Gasket)
   2. PVC Pipe and Fittings (4 Inch Through 15 Inch Diameter):
      a. General: Pipe and fittings conform to ASTM D3034.
      b. Materials: PVC plastics having a minimum cell classification of 12454B, 12454C, or 13364B as defined in ASTM D1784. Pipe materials shall have a minimum hydrostatic design stress of 2,000 psi as certified by the Plastic Pipe Institute. Additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 20 parts by weight per 100 of PVC resin in the compound.
      c. Design: Integral wall bell and spigot joint and a minimum wall thickness conforming to SDR 35 and/or SDR 26:
      d. SDR 35 for main line piping with depth up to 16 feet.
      e. SDR 26 for main line piping with depths greater than 16 feet, unless otherwise noted.
      f. Schedule 40 for all service laterals.
      g. Schedule 40 for all service riser pipe.
      h. Joints: Conform to ASTM D3212. Push-on type only with the bell-end grooved to receive a gasket. Elastomeric Seal (Gasket): A basic polymer of synthetic rubber conforming to ASTM F477. Natural rubber gaskets will not be accepted.
      i. Marking: Each pipe shall be identified with the name of the manufacturer or trademark and code, nominal pipe size in inches, the PVC cell classification, and “Specification D3034.”
   3. PVC Pipe and Fittings (15 Inch Through 42 Inch Diameter):
      a. General Requirements: Pipe and fittings shall conform to ASTM F794.
      b. Materials: Polyvinyl chloride compounds which comply with the requirements for a minimum Cell Classification of 12454B, 12364A, or 13343C as defined by ASTM D1784. Homopolymer PVC compounds must meet or exceed the requirements of the above listed minimum cell classification number. PVC compounds of other cell classifications shall be pre-qualified. Additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 of PVC resin in the compound.
      c. Design: Integral wall bell and spigot joint with elastomeric seal joints. Minimum Pipe Stiffness: 46 pounds per square inch (psi) at 5 percent deflection.
      d. Joints: Conform to ASTM D3212. Push-on type only with the bell-end grooved to receive a gasket. Elastomeric Seal (Gasket): Basic polymer of synthetic rubber conforming to ASTM F477, and be factory installed and chemically bonded to the bell-end of the pipe. Natural rubber gaskets will not be accepted.
      e. Marking: Each pipe shall be identified with the name of the manufacturer’s, or trade name or trademark, and code, nominal pipe size in inches, the PVC minimum cell classification, the legend “PS 46 PVC Series Pipe,” and ASTM F794.
   4. PVC Pipe and Fittings (36 Inch Through 54 Inch Diameter):
      a. General Requirement: Controlled inside diameter with an integral bell and elastomeric seal joints which meet the requirements of ASTM F1803, closed profile.
      b. Materials: Pipe and fitting shall be made from polyvinyl chloride compounds which comply with the requirements for a minimum Cell Classification of 12364A as defined by ASTM D1784.

c. Dimensions: Pipe sizes, inside diameters, and typical dimensions shall conform to those shown on Drawings. Outside diameter shall be constant along the length.
d. Joints: All pipe joints shall be of the bell and spigot type with elastomeric seals and conform to the requirements of ASTM D3212. Gaskets shall be factory installed and chemically bounded to the bell end of the pipe. Gasket material shall conform to the requirements of ASTM F477.
e. Fittings: All fittings shall be fabricated from pipe meeting the requirements of these standards. Fabricated miter joints shall be reinforced by fusion heat welding.
f. Pipe Stiffness: Minimum pipe stiffness shall be 46 psi when tested in accordance with ASTM D2412.
g. Impact Resistance: No visual cracking or splitting of the waterway shall be evidenced when tested in accordance with ASTM D2444 with a 30 lb. weight, Type B, flat plate holder B to a level of 220 ft. lbs.
h. Fusion Quality: There shall be no sign of flaking or disintegration when immersed in anhydrous acetone for 20 minutes as described in ASTM D2152.
i. Ductility: There shall be no evidence of cracking or splitting when pipe is flattened in a circumferential orientation between 2 flat plates to 60 percent of the original inside diameter.
j. Air Tightness: Each length of pipe shall pass a factory 3.5 psi air test as described in ASTM F1803.
k. Marking: Each pipe shall be identified with the name of manufacturer, nominal size, cell classification, ASTM designation F1803, the pipe stiffness designation “PS-46,” and manufacturer’s date code.

5. Reinforced Concrete (RCP) Pipe and Fittings:
   a. General Requirement: ASTM C76, Wall B with circular reinforcing, synthetic rubber gasketed R-4 joint.
   b. Materials: Conform to the requirements of ASTM C76, Wall B with circular reinforcing. O-ring gaskets shall be synthetic rubber, circular in cross- section, and conform to ASTM C361.
   c. Pipe Joints: Bell and spigot conforming to ASTM C361.
   d. Pipe Class: As shown on the Drawings.
   e. Marking: Each pipe shall be identified with the name of the manufacturer, or trade name or trademark, and code, identification of plant, date of manufacture, the pipe class, and specification design.
6. Liner:
   a. PVC: PVC liner shall be Amerplate T-Lock as manufactured by Ameron Protective Liner Division, Brea, California, or approved equal. The liner shall be installed in the entire 360 degree of the pipe interior surface.
   b. HDPE: HDPE liner shall be Studliner as manufactured by GSE Lining Technology, Inc., SureGrip (CPL) as manufactured by AGRU, or approved equal. The liner shall be installed in the entire 360 degree of the pipe interior surface.
7. Ductile Iron (DIP) Pipe and Fittings:
   a. General Requirement: AWWA C151.
   b. Joints: Mechanical or push-on conform to AWWA C111.
   c. Lining: 40 mil nominal thickness. Joint components shall be coated. Thickness on sealing areas in the bell socket interior and on the spigot end of the pipe exterior shall be 6 mil nominal.
   d. The acceptable linings are as follows:
   e. Polyurethane Coating System: 100 percent solids polyisocyanate resin and polyol resin mixed in 1:1 ratio at the time of application by an ASTM D16, Type V system. It must be applicable at surface temperatures ranging from 40° F. to 150° F.
   f. The lining shall be a composite lining utilizing a primer coating containing fusion bonded epoxy (FBE) and a surface coating containing fusion bonded polyethylene (FBP). The lining shall be PolybondPlus® as manufactured by the American Cast Iron Pipe Company (Birmingham, Alabama), or approved equal. All lining application must be performed by the pipe manufacturer at the pipe manufacturer’s facility.
   g. The lining shall be PROTECTO 401 Ceramic Epoxy, or approved equal, 40 mils thick.
   h. Testing Requirements:
   i. All ductile iron pipe and fitting linings shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC-PA-2 Film Thickness Rating.

j. The interior lining of all pipe barrels and fittings shall be tested for pinholes with a nondestructive 2,500 volt test. Any defects found shall be repaired prior to shipment.
k. Each pipe joint and fitting shall be marked with the date of application of the lining system, along with its numerical sequence of application on that date, and records maintained by the applicator of his work.
l. Pipe Class: As shown on Drawings.
m. Marking: Each pipe shall be identified with the manufacturer, or trade name or trademark, and code, country where cast, nominal pipe size, year in which the pipe was produced, and "DI" or "Ductile."

8. HDPE: SDR 17 (or as noted on Plans)
   a. Butt-Fusion

B. Provide pipe and fittings of each material type from same manufacturer.

C. Service Pipe Couplings:
1. Dissimilar Pipe Material Connection:
   a. Fernco, Inc., Series no. 5000 RC 1-piece eccentric series,
   b. Maxadaptor® as manufactured by Gripper Gasket LLC
   c. or approved equal.
2. PVC to PVC Connection:
   a. PVC Stop or Repair Coupling, Gasket by gasket joint.

2.02 MANHOLES

A. Precast Sections:
1. ASTM C478.
2. Structure Bases:
   a. Pre-cast integral with bottom section of manhole.
   b. Pre-cast invert.
   c. Outside Drop: Manhole bottom section to be pre-cast as monolithic base containing lower DIP elbow for drop.
3. Manhole Steps:
   a. Reinforced polypropylene plastic steps with No. 2 deformed grade steel rod.
   b. Neenah Foundry Step No. R1981J, Badger F-15, or approved equal.
4. Cone: Eccentric.
5. Joints: Rubber o-ring gasket type.
6. Pipe Joints:
   a. Rubber boot with stainless steel band.
   b. Watertight.

B. Covers and Frames:
1. ASTM A48: See plans for casting types.
2. Material: Class 35 cast iron. Best grade. Free from injurious defects and flaws.
3. Finish: Coal tar pitch varnish
4. Finish Preparation: Sandblast.
5. Machine cover and frame contact surface for non-rocking protection.
6. Covers with 2 concealed pick holes of approved design. Rubber gasket type self sealing covers shall be used.
7. Weight: Minimum of 380 lbs.
8. Cast labels "SANITARY SEWER" on each cover. Use 2 inch letters.

C. Seals: Infi-shield, Inc., or approved equal.

2.03 INSULATION

A. Insulate in accordance with Section 33 11 00 Water Distribution Systems.

PART 3 EXECUTION

3.01 PREPARATION

A. Line and Grade: Provide means for accurately transferring line and grade from ground surface stakes to working point in trench.

B. Water Stops: Provide in manholes as required to prevent infiltration into system.

3.02 CONSTRUCTION REQUIREMENTS

A. Pipe Installation:
   1. Comply with ASTM D2321 for PVC installation.
   2. Inspect pipe for defects and cracks while suspended before lowering into trench.
   3. Place pipe bell at upstream end of pipe length.
   4. Install pipe from lower to higher invert elevation at a uniform slope between manholes.
   5. Place plug in end of incomplete piping at end of day and when Work stops.
   6. Provide watertight plugs at future connection plugs.
   7. When water is present in trench, seals are to remain in-place while trench is pumped completely dry.
   8. See Section 31 05 05 for pipe foundation and backfill.
   9. Maximum Allowable Deviation From Staked Grade:
      a. Alignment: 0.30 feet.
      b. Elevation: 0.02 percent.

B. Manhole Installation:
   1. Place precast manhole base on compacted granular subgrade.
   2. Locate steps within 1 inch of vertical alignment and within 1 inch of required vertical spacing.
   3. Provide monolithic base for drop manholes.
   4. Maximum Allowable Deviation From Staked Grade:
      a. Alignment: 0.30 feet.
      b. Elevation: 0.03 feet.
   5. Neatly mortar lift holes

C. Construct Manhole Over Existing Pipe:
   1. Construct manhole over existing pipe at locations shown on the Drawings.
   2. Saw cut existing pipe to fit flush with inside wall of new structure.
   3. Seal any openings in manhole.

D. Services:
   1. Wye:
      a. Wye to be at 10 and 2 o'clock positions.
      b. Plugs installed with Atlastic 77, Sonolastic Sealant, or approved equal, or specifically designed for the opening to be plugged.
   2. Pipe:
      a. Extend pipe as noted on City of Hudson standard detail plates for services.
      b. Install pipe at minimum 1 percent to maximum 2 percent grade.
      c. Place gasketed plug at end of pipe.
      d. Mark end of service with a 4-inch by 4-inch by 8-foot timber set 4 feet below grade.
      e. Maintain a record of each service connection as follows to be submitted to Engineer at the end of each week:
         1) Type of service connection.
         2) Distance from downstream manhole.
         3) Length of riser.

   3. Riser Pipe:
      a. Extend riser from service connection at 45-degree angle above horizontal to a point 11 feet below street grade.
      b. Install riser pipe against undisturbed trench wall.

c. Place concrete collar around service connection as shown on Drawings.

E. Connect to Existing:
1. Connect to Existing Structure:
a. Connect to existing structure at location shown on the Drawings.
b. Core the hole in the structure, trimming the pipe flush with the structure, trimming the pipe flush with the pipe to seal it within the wall.
c. Reconstruct manhole bench/invert.
d. Make repairs to the structure.
2. Connect to End of Existing Pipe (Stub):
a. Locate and expose end of existing stub.
b. Remove or salvage existing plug and connect to pipe.

F. Insulation:
1. Insulation over pipe in locations as shown on the Drawings.
2. Insulation is to be placed wherever sanitary sewer line comes within 3 feet of any storm structure or line, or within 5 feet of the ground surface.

3.03 PROTECTION

A. Plug most downstream point of line or points if multiple separate lines to prevent runoff from entering City's system. Plug to remain in place until testing is completed.

B. Plug all entrances and openings to the system promptly and before suspension of operations at the end of working day.

C. Secure manholes and structures immediately after completion or before suspension of operations at the end of working day with casting or suitable alternative device.

D. Mark structure susceptible to being hit by construction or vehicular traffic.

E. Mark each plug location with 4 inch x 4 inch timber to above existing grade.

3.04 FIELD QUALITY CONTROL

A. Complete the following tests on trench backfill:
1. Compaction: Owner shall employ an independent testing laboratory to perform, at a minimum the following tests in locations determined by the Engineer:
1) Sewer Main:
a) 1 density test for every 300 feet of trench at varying depths (per 10 foot depth increments).
b) 1 gradation test per project for pipe bedding.
c) 1 gradation test per project for improved pipe foundation material.
2) Sewer Services:
a) 1 density test for every 4 services installed, at varying depths.

B. Remove all dirt and foreign material from pipe interior prior to testing.

C. Gravity Sewer Pipe:
1. Pipe Diameter 27 Inches and Smaller: Air test.
2. Pipe Diameter Larger Than 27 Inches: Infiltration test.

D. Perform the following tests upon completion of sewer construction and prior to any external plumbing connections:
1. Infiltration Test:
a. Manholes shall be watertight, with no leakage permitted.

b. Place 90-degree V-notch weirs in locations directed by Engineer to measure leakage in sewer lines.
c. Allowable leakage rate shall be 100 gallons/day/inch diameter/mile of sewer between any adjacent manholes.
d. Provide corrective measures for lines exceeding the allowable leakage rate.

2. Air Test:
   a. Place inflatable sewer stoppers in manhole at each end of reach to be tested.
   b. Connect 1 end of an air hose to plug used for air inlet.
   c. Connect other end of hose to portable air control equipment.
   d. This equipment consists of valves and pressure gages used to control the rate air flows to the test section and to monitor air pressure inside the pipe.
   e. Connect an air hose between compressor (or other source of compressed air) and control equipment.
   f. Add air to pipe section. Monitor air pressure so pressure inside pipe does not exceed 5.0 psig.
   g. When pressure reaches 4.0 psig, stop air supply so internal pressure is maintained for 2 minutes.
   h. These 2 minutes allow time for air temperature to come to equilibrium with the pipe walls.
   i. During this time check plugs with soap solution to detect any plug leakage. If plugs are found to leak, bleed off air, tighten plugs, and begin again by supplying air.
   j. After temperature has been allowed to stabilize for 2 minutes, disconnect air supply and allow pressure to decrease to 3.5 psig.
   k. At 3.5 psig, start stopwatch to determine time required for pressure to drop to 2.5 psig.
   l. Provide corrective measures for any line not meeting requirements.
   m. Test results are usually better if sewer pipe walls are damp at time of testing.
   n. Time shall be equal to or greater than the allowable time shown in table at end of this Section.

3. Deflection Test:
   a. Perform on PVC pipe at least 30 days after trench backfill has been placed.
   b. Perform test by pulling a mandrel through each line between manholes without aid of mechanical pulling devices.
   c. Mandrel requirements:
      1) Constructed of rigid steel and have an odd number of legs (9 legs minimum).
      2) Effective length shall not be less than its nominal diameter.
      3) Diameter = minimum 95 percent of the base inside diameter of the pipe.
   d. The line will be considered acceptable if mandrel can progress through line without binding.
   e. Provide corrective measures for lines not meeting these requirements.

Time Required for a 1.0 PSIG Pressure Drop for Size and Length of Pipe Indicated

1 Pipe Diameter (inches)	2 Minimum Time (hours: minutes: seconds)	3 Length for Minimum Time (feet)	4 Time for Longer Length (seconds)	Specified Minimum for Length (L) Shown (hours: minutes: seconds)							
				100 feet	150 feet	200 feet	250 feet	300 feet	350 feet	400 feet	450 feet
4	0:03:46	597	.190 L	0:03:46	0:03:46	0:03:46	0:03:46	0:03:46	0:03:46	0:03:46	0:03:46
6	0:05:40	398	.427 L	0:05:40	0:05:40	0:05:40	0:05:40	0:05:40	0:05:40	0:05:42	0:06:24
8	0:07:34	298	.760 L	0:07:34	0:07:34	0:07:34	0:07:34	0:07:36	0:08:52	0:10:08	0:11:24
10	0:09:26	239	1.187 L	0:09:26	0:09:26	0:09:26	0:09:54	0:11:52	0:13:50	0:15:48	0:17:48
12	0:11:20	199	1.709 L	0:11:20	0:11:20	0:11:24	0:14:16	0:17:06	0:19:56	0:22:48	0:25:40
15	0:14:10	159	2.671 L	0:14:10	0:14:10	0:17:48	0:22:16	0:26:42	0:31:10	0:35:36	0:40:04
18	0:17:00	133	3.846 L	0:17:00	0:19:14	0:25:38	0:32:02	0:38:28	0:44:52	0:51:16	0:57:42
21	0:19:50	114	5.235 L	0:19:50	0:26:10	0:34:54	0:43:38	0:52:22	1:01:04	1:09:48	1:18:32
24	0:22:40	99	6.837 L	0:22:48	0:35:54	0:45:36	0:57:00	1:08:22	1:19:46	1:31:10	1:42:34
27	0:25:30	88	8.653 L	0:28:50	0:43:16	0:57:42	1:12:08	1:26:32	1:41:00	1:55:24	2:09:48
30	0:28:20	80	10.683 L	0:35:36	0:53:26	1:11:14	1:29:02	1:46:50	2:04:38	2:22:26	2:40:14
33	0:31:10	72	12.926 L	0:19:06	1:04:38	1:27:52	1:47:44	2:09:16	2:30:48	2:52:20	3:13:54
36	0:34:00	66	15.384 L	0:51:18	1:16:56	1:42:34	2:08:12	2:33:50	2:59:28	3:25:08	3:50:46
42	0:40:28	57	20.942 L	1:09:48	1:44:42	2:19:38	2:54:30	3:29:24	4:04:20	4:39:14	5:14:08
48	0:46:14	50	27.352 L	1:31:10	2:16:46	3:02:22	3:47:56	4:33:32	5:19:06	6:04:42	6:50:18

FORMULA

The formula below calculates the specified minimum time required for a **1.0 psig pressure drop** from a starting pressure of 3.5 psig to a final pressure of 2.5 psig using a leakage rate of 0.0015 cubic feet/minute/square foot of internal surface.

Calculate all test times by the following formula:

T= 0.085 DK/Q

Where:
T = shortest time allowed for the **air pressure to drop 1.0 psig**, sec.
K = 0.000419 DL but not less than 1.0,
Q = leak rate = 0.0015 CFM/SF,
D = measured average inside diameter of sewer pipe, in., and
L = length of test section, ft.

END OF SECTION

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SECTION 33 34 00

SEWAGE FORCE MAINS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes installation of sewage force main.

B. Related Sections:
   1. Section 31 05 05 - Trench Excavation and Backfill
   2. Section 33 31 00 - Sanitary Sewer Systems

C. Method of Measurement:
   1. Force Main Pipe:
      a. Measure by length in feet of each diameter along pipe centerline.
      b. Measure from point of connection at lift station to center of discharge manhole.
      c. No deduction for fittings.
   2. Fittings:
      a. Measure by weight in pounds.
      b. Basis of Weight:
         1) Fittings: Meet AWWA C153.
         2) Exclude weights of glands, gaskets, rods, bolts, and other accessories.

D. Basis of Payment:
   1. Payment for acceptable quantities of force mains shall be at the Contract Unit Price as listed on the Bid Form. All associated Work items including tracer wire and appurtenances shall be considered incidental.

1.02 REFERENCES

A. ANSI:
   1. A21.4 - Standard for Cement - Mortar Lining for Ductile Iron Pipe and Fittings
   2. A21.11 - Standard for Rubber - Gasket Joints for Ductile Iron Pressure Pipe and Fittings
   3. A21.51 - Standard for Ductile Iron Pipe, Centrifugally Cast
   4. A21.53 - Standard for Ductile Iron Compact Fittings

B. ASTM:
   1. D2241 - Specification for PVC Pressure-Rated Pipe

1.03 QUALITY ASSURANCE

A. Provide certificates from manufacturers certifying that the following materials meet the referenced requirements:
   1. Force main pipe.

1.04 DELIVERY OF MATERIALS

A. Inspect all pipe and materials during the unloading process.

B. Notify Engineer and City of any cracked, flawed, or otherwise defective material.

C. Remove all materials found to be unsatisfactory by Engineer or City from the Site.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

A. High Density Polyethylene Pipe (HDPE):
   1. General Requirement (4 Inch through 24 Inch): AWWA C906:
   2. Minimum Hydrostatic Design Basis (HDR): 1,600 psi, in accordance with ASTM D2837.
   3. DR Series: 11.
   4. Minimum Working Pressure Rating (WPR): 160 psi.
   5. Marking: Each pipe shall be identified with the manufacturer's name, trade name or trademark and code from which plant location, machine and date of manufacturer; nominal pipe size in inches; the Ring Stiffness Constant Classification; and ASTM F714.
   6. Fittings: Meeting requirements of ASTM D2683 for socket-type fittings or ASTM D3261 for butt-type fittings.

B. Polyvinyl Chloride (PVC) Pressure Sewer Pipe:
   1. General Requirements: 4 Inch through 12 Inch in Diameter, AWWA C900:
      a. Cast iron pipe equivalent O.D.
      b. DR Series: 18.
      c. Minimum Pressure Rating: 150 psi.
      d. Joints: Elastomeric-gasket conforming to ASTM F477 and AWWA C900.
      e. Fittings: Shall be ductile iron fittings:
         1) Consistent with AWWA C110 cast iron or AWWA C153 ductile iron:
            a) Working Pressure: 250 psi.

C. Provide all pipe and fittings of each material type from the same manufacturer.

D. Utility Structures: In accordance with Section 33 31 00 – Sanitary Sewer Systems.

E. Tracer Wire and Appurtenances:
   1. Wire:
      a. Conform to the applicable requirements of NEMA WC3, WC5, and WC7.
      b. Shall be Underwriters Laboratories (UL) listed for use in direct burial applications (e.g. USE, UF, or tracer wire).
      c. Conductor: Minimum AWG No. 12 in copper rated to 30 volts.
      d. Outside Identification: Volts (or V), AWG size, UL and designation (ex. "tracer wire"). Wire shall be green for sanitary.
      e. Splice shall be accomplished by joining the 2 bare ends of the wires with either a copper mechanical split bolt compression fitting or a crimp-type compression sleeve for copper connections. No other connection is allowed.
      f. All joined splices shall be fully enclosed using a 3M Brand ScotchfilTM Electrical Insulation Putty. The putty shall be fully sealed and bonded on all sides.
      g. Splices shall not be more frequent than 1 splice per 250 feet.
   2. Access Boxes:
      a. Heavy Duty for Traffic Load.
      b. Manufacturers/models:
         1) Snake Pit, by Copperhead Industries, LLC. http://www.copperheadwire.com/pdf/snakepit.pdf
         2) Cathodic Test Box P200 series, by Bingham & Taylor http://www.binghamandtaylor.com/cathodic.htm.
      c. Approve Equal.
   3. Mechanical Joint Restraint:
      a. All pipe restraints shall be ductile iron. All joint restraints shall have a minimum of 150 psi pressure rating.
      b. Minimum Working Pressure: 150 psi.
      c. For PVC: EBAA Iron Series 1500 and 2500 bell restraints for C-900 PVC pipe and Uni-Flange Series 1500 Circle-Lock.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

A. General:

1. Inspect pipe for defects and cracks while suspended.

2. Remove all dirt and foreign material from pipe interior prior to lowering into trench.

3. Install pipe at a depth to maintain minimum of 6 feet of cover from final surface elevation unless otherwise shown on Drawings.

4. Check for alignment and grade and correct any irregularities found:
   a. Maximum Deviation: 2 inches from line and 1/4 inch from grade.

5. Do not vary actual horizontal position of the pipe centerline on alignment around curves by more than 1.75 feet from position shown.

6. Close and block the open end of the last laid section of pipe at all times when laying operations are not in progress, at the close of the day's work, or when the workers are absent from the job to prevent entry of foreign material or creep of the gasketed joints.

7. Pipe Foundation and Backfill Procedures: See Section 31 05 05.

8. Remove all dirt and foreign material from the pipe interior prior to testing.

9. Provide temporary sanitary sewer service per Section 01 51 00.

B. PVC Pipe:

1. Use pipe joint lubricant per manufacturer’s recommendations; no substitutions are permitted.

2. Dig bell holes of ample dimensions at joint locations in the bottom and sides of the trench as required to permit visual inspection of the entire joint.

3. Lay pipe with bell ends facing in the upstream direction.

4. After a section of pipe has been lowered into the prepared trench, clean the end of the pipe to be joined, the inside of the joint, and the gasket immediately prior to joining the pipe.

5. Check the gasket position feeler gauge supplied by the pipe manufacturer to assure proper seating:
   a. Feeler Gauge: Of proper size, type, and shape for use during installation for each type of pipe furnished.

6. After the joint has been made as specified under paragraph “JOINING PIPE,” check the pipe for alignment and grade.

7. Joint Deflection:
   a. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of the spigot into bell.
   b. Maximum Deflection: 50 percent of maximum deflection permitted by pipe manufacturer.
   c. Use 1 of the following methods if joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment:
      1) Shorter pipe lengths.
      2) Special mitered joints.
      3) Standard or special fabricated bends.
   d. Install thrust blocking if special mitered joints or bends are used.

8. Place sufficient pipe zone material to secure the pipe from movement before the next joint is made.

9. Joining Pipe:

    a. Bell-and-Spigot with Rubber Gasket Joints (Push-On Joints): Assemble in accordance with the manufacturer's instructions and the following:
        1) As next section of pipe is being readied for laying, clean bell of previously laid pipe of foreign material and apply thin film of specified lubricant to entire surface of bell ring.
        2) At same time, lubricate gasket and install in spigot groove.
        3) Ensure gasket tension is uniform around groove before placing pipe in trench.
        4) Lower pipe section into trench until approximately in line with previously laid pipe section and spigot is centered in bell.
        5) Then force pipe "home" as defined in manufacturer's installation instructions and secure to proper alignment and grade with specified pipe zone material.

C. High Density Polyethylene Pipe (HDPE):

1. Install piping and fittings consistent with the provisions of ASTM D2321 and with the manufacturer’s recommendations for installation.

2. Cut out and remove pipe sections with cuts or gouges with depth over 10 percent of the wall thickness. Rejoin undamaged portions of the section using butt fusion joining method.

3. Install mechanical couplings according to the coupling manufacturer’s recommendations.

4. HDPE pipe has a high coefficient of temperature expansion/contraction (approximately 1.2 to 10-4 in./in.° F.). Make final tie-ins to structures at a temperature as close to operating temperature as possible.

3.02 THRUST RESTRAINT

A. Location:

1. At pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist.
2. Thrust blocks where required whether or not shown.

B. Thrust Blocking:
1. Verify allowable soil pressure; do not exceed 1,000 pounds per square foot.
2. Place between undisturbed ground and fitting to be anchored.
3. Quantity of Concrete: Sufficient to cover area of bearing on pipe as shown or as approved.
4. Place blocking so that pipe joints will be accessible for repairs, unless otherwise approved.

3.03 TRANSITION TO DISSIMILAR PIPE

A. Install consistent with the manufacturer’s written instructions.

3.04 FITTING INSTALLATION

A. Anchor fittings by means of restrained joint devices installed according to manufacturer’s recommendations.

3.05 CORROSION PROTECTION

A. General:

1. Piping Accessories: Provide corrosion protection for ferrous metal piping appurtenances:

a. Tie-Rods and Similar Items: Heat shrink tube wrapped.
b. Flexible Couplings Grooved Couplings and Similar Items: Heat shrink wrapped, or cement-coated, and as shown on the Drawings.
c. Exposed Nuts and Bolts: Bituminous paint-coated.

3.06 ACCESSORIES

A. Tracer Wire:
1. Copperhead Industries.
2. Direct burial No. 12 AWG solid, 0.0808-inch diameter.
3. Steel core hard drawn extra high strength 1,150 pound average tensile break load.
4. 45 mil high molecular weight-high density polyethylene green color jacket complying with ASTM D1248.
5. 30 volt rating.

B. Test Station:
1. Tracer wire test stations shall be installed at each boring pit location (including gate valve and/or hydrant locations).
2. Each tracer wire test station shall be marked and identified with Tri-View Flex test station containing two internal terminals manufactured by Rhino Marking & Protection Systems or approved equal.
3. Test stations shall be green with Rhino Part #TVTI72BB2 or approved equal and shall contain one decal on each side of test station with Rhino Part #GD8-1332K or approved equal.

3.07 FIELD QUALITY CONTROL

A. Perform the following tests under the observation of the City upon completion of force main construction and prior to connection to lift station.
1. Pressure Test:
a. Subject the entire length of force main to hydrostatic pressure test of 100 psi for a period of 1 hour.
b. Maintain constant pressure throughout test period.
c. Provide pumps, gages, connections and other necessary apparatus.
2. Leakage Test:
a. Measure water volume required to maintain test pressure.
b. Allowable leakage shall be determined by the formula:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

L = Allowable Leakage in Gallons

S = Length of Pipe Tested in Feet

D = Nominal Diameter of Pipe in Inches

P = Test Pressure in Pounds/Square Inch

B. Provide corrective measures for any line exceeding allowable leakage.

END OF SECTION

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SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Storm sewer pipe, manholes, catch basins, fittings, and miscellaneous appurtenances.

B. Related Sections:
   1. Section 01 33 00 - Submittal Procedures
   2. Section 01 57 13 - Temporary Erosion and Sediment Control
   3. Section 32 11 23 – Dense Graded Base
   4. Section 32 16 13 - Concrete Curbs and Gutters
   5. Section 33 01 30 – Television Inspection of Sewers
   6. Section 33 05 05 - Trenching and Backfilling
   7. Section 33 05 17 - Adjust Miscellaneous Structures
   8. Section 34 41 05 – Traffic Signs and Devices

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Storm Sewer Pipe: Measurement will be based upon units of linear feet for each size, type, class, and depth increment 0 feet to 10 feet, 10 feet to 15 feet, and in 5 foot increments thereafter of pipe furnished and installed complete in place as specified, including excavation, backfilling, and compaction. Pipe will be measured from centerline of structure to centerline of structure and will not include end sections:
      a. Pipe bedding will be per Section 33 05 05.
      b. Improved pipe foundation material, if necessary, will be per Section 33 05 05.
   2. Catch Basin, Catch Basin Manhole, and Manhole Structure: Measurement will be per each, according to type and size, to a depth of 8 feet, for furnishing and installing structures complete in place as specified, including casting frame and cover, adjusting rings, and concrete stool grate frame per Detail STO-9 (if required). Grouting invert per the standard details shall be incidental to the structure installation:
      a. 70-percent partial payment will be made upon installation and 30-percent payment will be made upon final completion of doghouses and inverts.
   3. Structure Overdepth: Measurement will be per linear foot for depths greater than 8 feet for each diameter. Measurement will be made from final rim elevation to center of invert. Payment will include the cost of furnishing and installing the manhole sections:
      a. For structures with a sump, the linear feet of sump will not be included in the overdepth measurement.
   4. Apron Endwall with trash guard: Measurement will be per each size installed, according to type, at locations indicated in the Drawings complete in place as specified, including excavation, backfilling, compaction and trash guard:
      a. Where a sewer line is terminated with an endwall, tying the last 3 joints per Detail STO-11 is considered incidental to the installation of the pipe.
   5. Apron Endwall without trash guard: Measurement will be per each size installed, according to type, at locations indicated in the Drawings complete in place as specified, including excavation, backfilling, and compaction:

a. Where a sewer line is terminated with an endwall, tying the last 3 joints per Detail STO-11 is considered incidental to the installation of the pipe.

6. Riprap: Measurement will be per cubic yards of riprap placed, according to class. Payment of the Bid Item shall include placement of geotextile fabric as required per Detail STO-12.
7. Grouted Riprap: Measurement will be per cubic yards of riprap placed, according to class. Payment of the Bid Item shall include placement of geotextile fabric, and 6" concrete layer as required per Detail STO-13.
8. Connect to Existing Pipe: Measurement shall be per each connection made, according to size and type of existing pipe, and regardless of type of existing bulkhead or plug, or type of connection made. Payment will include all costs related to making the connection, including removal and disposal of the existing bulkhead or plug, and construction of concrete collar if necessary.
9. Connect Existing Pipe to New Structure: Measurement shall be per each pipe connected to the new structure, regardless of size of existing pipe. Payment will include all costs related to making the connection, including removal and replacement of existing pipe as directed by Engineer.
10. Connect to Existing Structure: Measurement shall be per each connection made, regardless of size of opening, type of existing bulkhead, or type of existing structure. Saw cutting of the pipe installed in the opening if necessary shall be considered incidental. Core cutting the connection and reconstruction of existing structure invert if necessary shall also be considered incidental to the connection.
11. Bulkhead Storm Sewer Pipe: Measurement will be per each bulkhead installed according to size. Payment will include all costs related to bulkheading or plugging the pipe as described in this Section.
12. Poured-In-Place Concrete Seepage Collar: Measurement will be per each collar constructed according to size of pipe it is constructed around. Payment at the Unit Price shall include all costs related to constructing the collar in accordance with Detail STO-15, including excavation, forms, and material.
13. Construct Manhole Over Existing Pipe: Measurement will be based on the diameter of each manhole constructed over the existing pipe, up to a depth of 8 feet. Payment will include the cost of the manhole and installation over the existing line, casting frame and cover, and adjusting rings in place as specified.
14. Patch Structure: Measurement will be per each storm sewer or sanitary sewer structure patched, regardless of the size of structure or areas patched. Payment will include all cost associated to patching the structure as specified.
15. RC LR Bend: Measurement will be per each, according to size and class. Payment will include all costs related to furnishing and installing the bend, including excavation, backfilling, and compaction.
16. Televise Storm Sewer: Measurement and Payment will be per Section 33 01 30.
17. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. American Society of Testing and Materials (ASTM):
   1. A153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   2. C76 - Specification for Reinforced Concrete Culvert, Drain, and Sewer Pipe
   3. C361 - Specification for Reinforced Concrete Low Head Pressure Pipe
   4. C443 - Specification for Joints for Circular Concrete Sewer and Pipe, Using Rubber Gaskets
   5. C478 - Specification for Precast Reinforced Concrete Manhole Sections

B. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", 2019 (WisDOT Spec.):
   1. 606 – Riprap
   2. 645 – Geosynthetics

C. National Association of Sewer Service Companies (NASSCO):
   1. PACP – Pipeline Assessment Certification Program

1.04 SEQUENCING AND SCHEDULING

A. Maintain existing storm sewer flows during construction. This may require a temporary pipe connection during periods of time when construction is not occurring.

B. Set up traffic control to prior to removals. Maintain traffic during storm sewer improvements unless otherwise approved by Owner.

C. Do not pursue work-causing shut off of utility service (gas, water, electric, telephone, TV, etc.) to consumers until the utility owner is contacted and all consumers are notified of the shut-off schedule.

D. Successfully complete required inspections and tests before commencement of Section 32 11 23 and Section 32 16 13.

E. Coordinate inspection of completed sump structures with City prior to acceptance. May require pumping water and vacuuming dirt out of structure prior to inspection.

F. Televise Storm Sewer:
   1. Notify Engineer 48 hours in advance of the televising of all pipes.
   2. Conform to Section 33 01 30

1.05 SUBMITTALS

A. Submit Shop Drawings for storm sewer structures consistent with Section 01 33 00.

B. Shop drawings shall indicate complete information for fabrication and installation of units. Include the following:
   1. Plans and elevations locating and defining all material furnished by manufacturers.
   2. Sections and details showing connections, cast-in items, and field installed lifting devices, capacities, all openings, and their relation to the structure.

C. Submit Manufacturer's Certificate of Compliance for the following items:
   1. Gray iron castings.
   2. Precast manhole sections.
   3. Riprap.

D. Manhole/Catch Basin Elevation Report:
   1. Complete the report in Section 01 33 00.

E. Televising Report:
   1. Conform to Section 33 01 30.

F. Submit Product Data for the following items consistent with Section 01 33 00:
   1. Mortar mix.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ready Mix Mortar Materials:
   1. Sand Mix, 4,000 PSI

B. Mortar:
   1. Non-Shrink Grout: Pre-mix bag material. Minimum compressive strength of 3,000 psi.

2.02 STORM MANHOLE AND CATCH BASIN FRAMES AND COVERS

A. Conform to Section 33 05 17.

2.03 STORM MANHOLES AND CATCH BASINS

A. Precast concrete sections conforming to ASTM C478 and this section:
   1. No structure constructed either partially or completely from segmental block will be accepted:
      a. Shallow structures that cannot be constructed in the standard manner shall be fabricated in a precast design similar to Detail Drawing STO-10.
   2. Preformed inverts are not allowed.
   3. No structures with any cracks will be accepted.
   4. All sections shall be cured by an approved method and shall not be shipped nor subjected to loading until the concrete compressive strength has attained 3,000 psi.
   5. The date of manufacture and the name and trademark of the manufacture shall be clearly marked on the inside of each precast section.

B. Size: Dimensions as indicated on the Drawings.

C. Special requirements are shown on the Drawings.

D. Manhole Joints: Rubber gasketed joint forming a watertight seal conforming to ASTM C443.

E. Manhole Steps: Reinforced polypropylene plastic steps with No. 2 deformed grade steel rod.

F. Design:
   1. Have the manhole sections and top and bottom slabs designed and the detailed drawings prepared by a Professional Engineer, experienced in precast concrete manhole design, who is registered in the Project's state.

2.04 PIPE MATERIALS

A. Reinforced Concrete Pipe (RCP) and Fittings:
   1. General Requirement: ASTM C76.
   2. Profile gaskets: shall be synthetic rubber, circular reinforcing in cross-section, and shall conform to ASTM C443.
   3. Pipe Joints: Bell and spigot ASTM C361.
   4. Pipe Class: As shown on the Drawings.
   5. Marking: Each pipe shall be identified with the name of the manufacturer trade name or trademark and code, identification of plant, date of manufacture, and the pipe class and specification design.

2.05 TRASH GUARDS

A. General Requirement: ASTM A153.

B. Materials: Galvanized steel rods meeting the requirements in ASTM A153.

C. Bar size and configuration as shown on the Drawings.

D. Securely attached to end section.

2.06 RIPRAP

A. General Requirement: Conform to WisDOT Spec. 606:
   1. Granular Filter: Conform to WisDOT Spec. 209.2, Grade 1
   2. Geotextile: Conform to WisDOT Spec. 645.2.2.6, Type HR
   3. Concrete: Conform to WisDOT Spec. 606.2.2

2.07 CONCRETE STOOL GRATE FRAME FOR OFF STREET CATCH BASIN

A. General Requirement: Conform to Standard Detail Plate STO-9.

PART 3 EXECUTION

3.01 PREPARATION

A. Trench Excavation and Backfill shall conform to Section 33 05 05.

3.02 EXAMINATION

A. Commence test procedures only when pipe and structures are clean and free of dirt, water, or other foreign matter. Pipe cleaning shall be performed in accordance with NASSCO Jetter Code of Practice.

3.03 INSTALLATION

A. Connect to Existing Structure:
   1. Connect to existing structure at location shown on the Drawings.
   2. Core the hole in the structure and saw cut the pipe per the Standard Details:
      a. Pipe shall protrude past inside wall of structure a minimum of 2 inches and maximum of 4 inches from a distance half the pipe diameter measured from invert.
   3. Bulkhead void between outside wall of pipe and edge of opening with non-shrink grout and block/brick.
   4. Reconstruct manhole bench/invert.

B. Connect Existing Pipe to New Structure:
   1. Where an existing structure is removed and replaced with a new structure, connect all existing pipes to the new structure.
   2. Remove pipe segments that are damaged during the structure replacement with new pipes of the same size and type, or as directed by Engineer.
   3. Saw cut existing or new pipes per the Standard Details:
      a. Pipe shall protrude past inside wall of structure a minimum of 2 inches and maximum of 4 inches from a distance half the pipe diameter measured from invert.

b. Bulkhead void between outside wall of pipe and edge of opening with non-shrink grout and block/brick.

C. Connect to End of Existing Pipe:
   1. Connect to existing pipe at locations shown on the Drawings.
   2. Locate and expose end of existing pipe.
   3. Remove existing bulkhead or plug and dispose of off Site:
      a. Take care not to damage existing pipe.
      b. Any segment of pipe damaged by Contractor shall be replaced with new materials at no expense to the Project.
   4. Utilize standard bell and spigot joint with rubber profile gasket if possible.
   5. If butt connection must be made to existing pipe, construct concrete collar around joint. Collar shall be minimum 12 inches thick in all locations and shall extend a minimum of 12 inches each way of the joint.

D. Pipe Installation:
   1. Lay and maintain pipe appurtenances to the alignment, grade, and location shown on the Drawings and/or staked in the field. No deviation from the Drawing and/or staked alignment, grade, or location is allowed, unless approved by Engineer. Deviation from grade in excess of 0.05 percent (with no intermediate high points, level sections, or reverse invert slope) may be cause for removal and relaying pipe at the Contractor's expense.
   2. General Pipe Installation Procedures:
      a. Wipe joints clean; apply the manufacturer's recommended lubricant compound over the entire joint surface; center spigot in bell and push spigot home; take care to prevent dirt from entering the joint space; bring pipe to proper line and grade, and secure pipe in place by properly bedding.
   3. Lay pipe upgrade with spigot ends pointing in the direction of flow.
   4. All joints must be watertight.
   5. Remove all foreign matter or dirt from inside the pipe. Keep the bell and spigot clean during and after installation. Take care to prevent dirt from entering the joint space. Remove any superfluous material from inside the pipe after pipe installation by means of an approved follower or scraper.
   6. Where cut-ins make it impossible to construct bell and spigot joints or when dissimilar pipe materials are joined, a reinforced concrete collar shall be placed completely surrounding the joint or the connection shall be made by using an approved adapter.
   7. Any pipe which has been disturbed after being laid must be taken up, the joint cleaned and properly re-laid as directed by the Engineer.
   8. Where a sewer line outlets to grade or where the line is terminated with an endwall:
      a. Fasten at least the last 3 joints together using 2 "U" bolt fasteners per joint approved and as recommended by the pipe manufacturers, on the outside of the pipe.

E. Structures and Appurtenances Installation:
   1. Furnish and install structures in accordance with the Drawings.
   2. Excavate to depth and size as shown in the Drawings.
   3. Structure inverts:
      a. Construct inverts of manholes and catch basins using a Ready Mix mortar material (sand mix 4,000 PSI).
      b. Construct inverts shaped to the half section of equivalent size pipe conforming to the inlet and outlet pipe so as to allow for a free, uninterrupted flow with all surfaces sloping to the flow line.
   4. Concrete pipes entering manholes:
      a. End of pipes must be cut with a concrete saw.

b. Annular space between the outside of the pipe and opening in the structure shall be filled with a non-shrink grout on the interior and exterior of the structure. Construct an interior collar/doghouse around the pipe from the wall of the structure to the end of the pipe with non-shrink grout.

5. Steps:
   a. Locate on the downstream side, except for pipe 24 inches in diameter or greater. Install in the most appropriate place, to provide suitable access.
   b. Secure and neatly mortar in place 16 inches on center spacing.
6. Position vertical wall of the eccentric cone on the downstream side.
7. On structures with a build that contains more than 1 barrel section, the section immediately below the precast top slab shall be maximum 24 inch height.
8. Lift holes shall be neatly mortared up.
9. Remove all debris from structures, invert, and benches prior to final inspection and acceptance.
10. Remove all water and debris from Sump Manhole Structures, to allow for final inspection and acceptance.
11. Install Adjustment Rings and Adjust Casting: Conforming to Section 33 05 17.

F. Construct Manhole Over Existing Pipe:
1. Construct manhole over existing pipe at locations shown on the Drawings.
2. Saw cut existing pipe per Standard Details:
   a. Pipe shall protrude past inside wall of structure a minimum of 2 inches and maximum of 4 inches from a distance half the pipe diameter measured from invert.
3. Seal any openings in manhole.

G. Riprap:
1. General: Conform to WisDOT Spec. 606.3.3.
2. Install Rip Rap per Detail Plate STO-12 and STO-13 prior to placement of apron endwall.
3. Place 6” thick layer of concrete at the midpoint of the Rip Rap per Detail Plate STO-13.

H. Bulkhead Pipe:
1. Bulkhead pipe at locations shown on Drawings with brick, non-shrink concrete grout, or concrete block masonry 8 inches thick.
2. Precast concrete plugs may be used in lieu of bulkhead. Plug must fit snugly into pipe opening and be watertight.

I. Seepage Collar:
1. Construct at location indicated on Drawings.
2. Construct per Detail on Drawings.

J. Patch Structure Walls, Doghouse, Invert, or Rings:
1. Clean areas to be patched by removing debris, loose concrete, and any other foreign materials.
2. Patch area with mortar to provide smooth patch that seals the structure.

K. Concrete Stool Grate Frame:
1. Construct on off street catch basins as shown on the plans or as directed by Engineer.
2. Construct per Detail on Drawings.

L. Storm Structure Location Marker:
1. Off street structures shall be marked permanently with the specified sign and sign post as indicated on the plans.
2. Install sign in accordance with Spec. Section 34 41 05.

3.04 FIELD QUALITY CONTROL

A. Scope:
   1. All pipeline testing is considered incidental to the Bid cost of the pipe.
   2. Engineer to observe and verify that all tests and visual inspections have been completed prior to final acceptance.

B. Cleaning:
   1. Consists of Cleaning the Pipe and Structures:
      a. If newly installed mains and structures are kept clean during construction, cleaning will not be required.
      b. If newly installed mains and/or structures become dirty due to negligence of the Contractor, cleaning will be performed at the sole expense of the Contractor.
   2. The bailing or flushing method of cleaning pipe is acceptable only if adequate provisions acceptable to the Engineer for keeping dirt and debris out of the existing sewer system or ponds are employed. Jetting may be required.
   3. Complete prior to final inspection for acceptance.

C. Required Tests and Inspections:
   1. Infiltration:
      a. To determine the amount of ground water infiltration into the sewers.
      b. Test waived if no visible infiltration is observed during the lamping inspection.
      c. Measurement made by means of 90 degree v-notch weirs placed in the lines as directed by the Engineer.
      d. Measurements taken at the points where in the Engineer's opinion the flow of water in the sewer is greater than the maximum allowable leakage.
      e. Maximum Allowable Rate of Leakage: Not more than 100 gallons per mile per inch diameter per day.
      f. Tests may be taken between individual manholes and the infiltration in any given line must not exceed the specified maximum allowable rate.
      g. Method of Measurement: Measurement of time for a predetermined volume of flow to occur.
   2. Trench Backfill Compaction:
      a. The Owner shall have an independent testing laboratory perform, as minimum, the following tests. The location of the tests shall be determined by the Engineer:
         1) 1 density test for every 300 feet of trench at varying depths (per each 10' depth increment).
   3. Alignment:
      a. Horizontal deviation in excess of 3 inches from back of curb to back of structure opening (for casting and rings) is not allowed. Deviation in excess of 3 inches will be cause for reinstallation of structure at the Contractor's expense.
      b. The vertical and horizontal alignment of the casting adjustment shall be approved by the Engineer prior to constructing the 10-foot concrete curb and gutter transition on either side of the casting.
   4. Lamping:
      a. Verify installation is true to line and grade.
      b. Verify installed pipe is structurally sound.
      c. Verify there are no broken or defective pipes.
      d. Verify that joints are all home.
      e. Verify that structures conform to specified requirements.

3.05 STORM SEWER CLOSED CIRCUIT TELEVISION INSPECTION

1. Conform to Section 33 01 30.

3.06 PROTECTION

A. Plug all entrances and openings to the system promptly and before suspension of operations at the end of working day.

B. Secure manholes and structures immediately after completion or before suspension of operations at the end of working day with castings or suitable alternative device.

C. Mark all structures to avoid being hit by construction or vehicular traffic.

D. Mark each plug location with 4 inches by 4 inches timbers to above grade to aid in marking the future connection.

E. Establish erosion control measures as per Section 01 57 13.

END OF SECTION

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SECTION 33 46 00

SUBDRAINAGE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Storm sewer service and drain tile.

B. Related Sections:
   1. Section 33 05 05 - Trenching and Backfilling
   2. Section 33 31 00 - Sanitary Sewer Systems

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Perforated PVC Drain Tile, Schedule SDR 26: This Bid Item shall be used for installation of Drain Tile for subgrade drainage within street areas. Measurement will be by linear feet of pipe along its axis, according to size, and with no regard to intervening fittings. Payment shall include all costs related to furnishing and installing the draintile pipe per standard detail STO-14, including geotextile, aggregate and fittings:
      a. It should be noted that due to the estimation required for Drawing preparation, the quantity of drain tile actually constructed may vary significantly from those given in the Bid Form.
      b. The Engineer reserves the right to increase or decrease the Drain Tile quantity, and associated Connect Drain Tile to Structure quantity, with no change to the Contract Unit Price. No additional compensation will be considered or allowed for changes to the estimated quantities or for the deletion of any of these Bid Items in their entirety.
   2. Connect Drain Tile to Existing Structure: Measurement will be per each. Payment will include all costs related to core drilling a hole in the storm sewer structure, making the connection, and patching as specified.
      a. Connecting to an existing hole in a precast structure will be considered incidental to the installation of the drain tile pipe.
   3. Storm Sewer Service: Measurement will be by linear feet of pipe actually installed, according to size and type, as measured along the axis of the pipe with no regard to intervening fittings. Payment at the Unit Price shall be compensation in full for all work and costs, including excavation, pipe, fittings, backfill, and trench compaction:
      a. Connecting to an existing hole in a precast structure will be considered incidental to the installation of the service pipe.
      b. PVC plug for the end of the service is considered incidental.
   4. Pipe Bedding for the PVC Storm Sewer Service Pipe: Measurement and payment shall be per Section 33 05 05.
   5. Supplying and installing required markers at service ends shall be considered incidental to the service installation.
   6. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition including all current supplements (WisDOT):
   1. Section 209 – Granular Backfill
   2. Section 501 - Concrete
   3. Section 612 – Underdrains

B. ASTM:
   1. D1784 – Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds
   2. D3034 - Specification for PVC Sewer Pipe and Fittings
   3. D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
   4. F477 - Elastomeric Seals for Joining Plastic Pipe

1.04 SEQUENCING AND SCHEDULING

A. Install sanitary sewer, water main, storm sewer, and all pipe deeper than the services prior to the installation of the services.

B. Install draintile after completion of granular backfill and prior to dense graded base placement.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

A. Drain Tile: PSM Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings:
   1. General: Pipe and fittings shall be made of compounds conforming to ASTM D1784 in accordance with the material requirements of ASTM D3034.
   2. Design: Integral bell gasketed joint and a minimum wall thickness conforming to SDR 26.
   3. Joints: Elastomeric gasket joints providing a water-tight seal conforming to ASTM D3212 or ASTM F477.
   4. Perforations: Circular on 3-1/4 inches by 6-1/4 inches centers. Hole size: maximum of 3/8 inch and a minimum of 3/16 inch, arranged in 4 rows along the full length of the pipe.

B. Storm Sewer Service: Poly (Vinyl Chloride) (PVC) Schedule 40 Plastic Pipe conforming to Section 33 31 00.

2.02 BEDDING MATERIAL FOR STORM SEWER SERVICE

A. Granular Backfill meeting WisDOT 209.2, Grade 1, except as modified below:
   1. 100 percent passing, by weight, the 1 inch sieve.
   2. Furnished by Contractor from a site located off the Site.
   3. No on Site granular material encountered during construction may be used.

2.03 DRAIN TILE AGGREGATE

A. The filter aggregate shall conform to the requirements of WisDOT 501.2.5.4, Class 2 for coarse filter aggregate, unless otherwise shown on the plans.

2.04 GEOTEXTILE

A. Geotextile wrap shall conform to WisDOT 612.2.8.

PART 3 EXECUTION

3.01 GENERAL

A. The location and alignment of the subsurface drains and outlets will be determined in the field by the Engineer, based on subsurface conditions.

3.02 DRAIN TILE INSTALLATION

A. Conform to details on Drawings.

B. Construct at locations and elevations determined by Engineer or as shown on the Drawings.

C. Pipe Bedding: drain tile aggregate.

D. Grade: Unless otherwise specified or shown on the Drawings, the grade of pipes shall not be flatter than 0.50 percent or match the street grade.

E. Plug upstream end of the drain pipe.

F. Sections of the drain pipe shall be firmly joined.

G. Place pipe so that the perforations are in the position indicated on the Drawings or designated by the Engineer.

H. Connections: Connect to hole provided in precast structure and seal joint with mortar (incidental).
   1. Core drill connection to structure where precast hole is not provided will be paid under the Connect Drain Tile to Existing Structure Bid Item.

I. Compaction: Conform to Section 33 05 05.

J. Flushing: After installation has been completed, pipes shall be flushed with sufficient water to remove material that has entered the pipes during construction.

3.03 STORM SEWER SERVICE INSTALLATION

A. Construct at locations and elevations determined by Engineer or as shown on the Drawings.

B. Pipe Bedding: Bedding material.

C. Grade: Unless otherwise specified or shown on the Drawings, the grade of pipes shall not be flatter than one percent.

D. Plug upstream end of pipe.

E. Sections of the pipe shall be firmly joined.

F. Connections: Connect to hole provided in precast structure. Seal joint with mortar.

G. Compaction: Conform to Section 33 05 05.

3.04 FIELD QUALITY CONTROL

A. Do not backfill trench until the pipe has been inspected and approved by the Engineer.

B. Compact all trench backfill with mechanical means by "Standard Compaction."

3.05 PROTECTION

A. Mark each storm sewer service plug location with 4 inch by 4 inch timbers to above grade to aid in marking the future connection.

END OF SECTION

SECTION 34 41 05

TRAFFIC SIGNS AND DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Signs, signposts, and hardware.
   2. Permanent barricades.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Sign Type II: Measurement shall be per square feet, according to type of sign. Payment shall be for furnishing and installing sign and post(s) at the staked location.
      a. There shall be no additional compensation for posts regardless of length or required configuration.
      b. There shall be no additional compensation for posts installed in concrete or asphaltic surfaces.
   2. Street Name Sign: Measurement shall be per each assembly installed. A complete assembly shall include all applicable street name blades, hardware, and post(s). Payment shall be for all costs for furnishing and installing sign, hardware, and post(s) at the staked location.
      a. There shall be no additional compensation for posts regardless of length or required configuration.
      b. There shall be no additional compensation for posts installed in concrete or asphaltic surfaces.
   3. Permanent Barricade: Measurement will be per each. Payment will include all costs related to furnishing and installing the barricade per the Standard Detail:
      a. The future road extension sign, if required, will be paid separately as a new sign under the appropriate Bid Item.
   4. Structure Marker Sign: Measurement will be per each. Payment will include all costs related to furnishing and installing the sign and sign post per the Standard Detail.
   5. All other Work and costs of this Section shall be incidental to the Project and included in the Total Base Bid.

1.03 REFERENCES

A. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition including all current supplements (WisDOT):
   1. Section 209 – Granular Backfill
   2. Section 634 – Wood and Tubular Steel Sign Posts
   3. Section 637 – Signing

B. Wisconsin Manual for Uniform Traffic Control Devices (WMUCTD).

C. Wisconsin Department of Transportation Sign Plate Manual.

D. Wisconsin Traffic Engineering, Operations and Safety Manual (TEOpS):
   1. Chapter 2 – Signs.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Upon delivery to the Site, store the materials at least 10 feet away from any construction or traveled roadways areas. Vehicles and equipment shall not be stored, even temporarily, in the buffer zone of the work area or where it would be so close to moving traffic that it is in the judgment of the Engineer a potential hazard to motorists.

1.05 SEQUENCING AND SCHEDULING

A. Notify the Engineer at least 48 hours prior to commencing the work under this Section of the Contract for required staking of sign locations.

B. Schedule an onsite pre-signing meeting with the Owner, Engineer, and Signing Subcontractor (if appropriate) a minimum of 24 hours prior to the installation of any signing.

C. Schedule private utility locates through the Diggers Hotline, prior to sign post installation.

D. Contact St. Croix County for all signs within the County right-of-way that will require temporary or permanent removal.

E. Install signs within 7 calendar days after placement of the pavement adjacent to the sign locations.

F. Install signs concurrently with paving done under traffic.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sign Panels:
   1. Sign Panel Base Material: sheet aluminum alloy conforming to WisDOT Spec. 637.2.1.3.
   2. Sign Face Materials: All sign reflective sheeting backgrounds shall be Type H conforming to WisDOT Spec. 637.2.2 with the following exceptions:
      a. School signs: Type F (Yellow-Green)
      b. Pedestrian Crossing Signs: Type F (Yellow-Green)

B. Street Name Signs:
   a. Street name blades base material shall be 9-inch aluminum extrusion conforming to WisDOT Spec. 637.2.1.1.
   b. First Letter of suffix shall be 6 inch uppercase with all letters remaining 4.5 inch lowercase
   c. If required on the Drawings, address numbers provided at a later date.
   d. Public Streets: signs to be "green" in color with "white" lettering.
   e. Private Streets: signs to be "blue" in color with "white" lettering.

C. Sign Posts:
   1. General:
      a. All sign post material shall be steel tubular square conforming to WisDOT Spec. 634.2.5.
      b. Holes shall be 7/16 inch pre-punched.

D. Hardware:
   1. Sign Panel:
      a. No rivets:
      b. Bolt: 5/16 inch – 18 by 3 inch grade 5 zinc plated.
      c. Nut: 5/16 inch – 18 grade 5 zinc plated.

d. Nylon Washers: 5/16 inch inside diameter, 7/8 inch outside diameter.
e. Washers: 5/16 inch grade 5 zinc plated.

2. Street Name Signs:
   a. Square Post Top Bracket: 5-1/4 inch minimum wide slot, unpainted.
   b. Cross Piece Bracket: 5-1/4 inch minimum wide slot, unpainted.

E. Anchor System Hardware:
1. Bolt: 5/16 inch – 18 by 3-1/4 inch grade 5 zinc plated.
2. Nut: 5/16 inch – 18 grade 5 zinc plated.
3. Corner Bolt with Nut: 5/16 inch diameter medium corner, grade 5 zinc plated.

F. Box-out:
1. Removable concrete forming tube: 12-inch inside diameter to the depth of pavement shown on plans.
2. Granular Backfill: Grade 1 conforming to WisDOT 209.2.2

G. Permanent Barricade:
1. Per Standard Detail STR-18.

H. Structure Marker Sign:
1. Per Standard Detail Plate WAT-11
2. Per Standard Detail Plate STO-16

PART 3 EXECUTION

3.01 GENERAL

A. Unless otherwise noted or modified herein, all sections of WisDOT Spec. 634 and 637, all sections of WisDOT's Sign Plate Manual, and Chapter 6 of WMUTCD shall apply.

B. The fabrication of all signs and devices shall conform to WisDOT Spec. 634 and 637, the WisDOT Sign Plate Manual, and the latest edition of the WMUTCD.

3.02 PREPARATION

A. Submit shop drawings for street name sign blades to the Owner and Engineer for review and approval prior to fabrication:

3.03 CONSTRUCTION

A. Sign locations shown on the Drawings are only approximate. The final locations shall be determined in the field by the Engineer. Have all underground utilities located prior to installing all signposts. Provide Engineer 48-hour notice prior to sign installations to allow for adequate staking time:
1. See WisDOT Sign Plate Manual: Series A4-3, for installation details.
2. Standard location for street name sign posts shall be a minimum 8 feet behind the back of curb or edge of traveled road at mid-radius.

B. Fabricate, hole punch, and mount sign panels in accordance with the standard drawings in the WisDOT Sign Plate Manual. Date the back of each newly installed sign panel with a theft warning sticker stating the month and year using inventory/I.D. stickers approved by the Owner.

C. Installation of Sign Panel to Post:
   1. Order: nut**,** zinc plated washer**,** sign post**,** sign panel**,** nylon washer, zinc plated washer, bolt
   2. Do not over tighten bolts to the point where the sign sheeting separates form the sign backing, which would be cause for rejection and replacement with no additional cost to the Contract.
   3. Street Name Blade Post shall not extend above the street name blades.

D. Installation Anchorage System:
   1. Install inside anchor tube so two bolt holes are accessible above finish grade.
   2. Install outside anchor tube flush with ground post. Bolt stabilizing sleeve and ground post together 12 inches below finish grade.
   3. Insert upper tube (minimum 6 inches) into inside anchor tube and secure with corner bolt.

E. Within Concrete surfacing:
   1. Contractor is responsible for furnishing, installing, and removing removable concrete forming tube to create a box-out for the sign post.
   2. After installation of sign posts in box-outs, backfill voids with specified granular material

F. Permanent Barricade:
   1. Install at locations shown on Drawings and per Standard Detail STR-18.
   2. Barricades to span entire roadway.
   3. If shown on Drawings or required by Engineer, attach "Future Road Extension Sign".
   4. If shown on Drawings or required by the Engineer, attach "end of road marker", 9 button, red on black sign.

G. Structure Marker Sign:
   1. Install at locations shown on the plans and per Standard Detail Plates WAT-11 and STO-16.

3.04 FIELD QUALITY CONTROL

A. All work shall conform to WisDOT Spec. 634 and 637.

3.05 CLEANING

A. Clean any sign after installation if requested by the Engineer.

END OF SECTION