GREEN STREET REHABILITATION

CITY OF BATH
BATH, MAINE

BIDDING/CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

JUNE 2022

14101A

WRIGHT-PIERCE
Engineering a Better Environment

CITY OF BATH

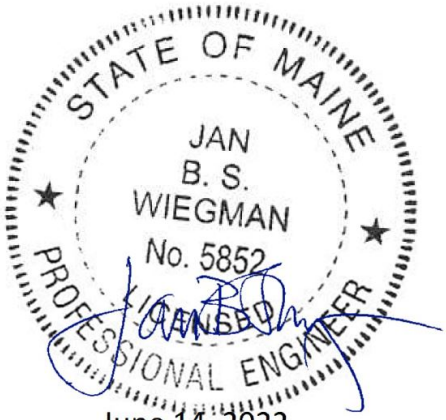
BATH, MAINE

BIDDING/CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

FOR

GREEN STREET REHABILITATION

JUNE 2022



June 14, 2022

Prepared By:

Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, Maine 04086
Phone: 207-725-8721

TABLE OF CONTENTS

SECTION 00100

ADVERTISEMENT FOR BIDS

City of Bath
Bath, Maine
Green Street Rehabilitation

General Notice

The City of Bath (Owner) is requesting Bids for the construction of the following Project:

Green Street Rehabilitation

Bids for the construction of the Project will be received at the **Bath City Hall** located at **55 Front Street, Bath, Maine 04530**, until **July 14, 2022 at 1:00 PM** local time. At that time the Bids received will be **publicly** opened and read.

The Project includes the following Work:

Storm drain separation with approximately 1,200 feet of new storm drain, 1,200 feet of new sewer line and the rehabilitation of Green Street (1,250 feet long) with a reclaimed and repaved 26-foot wide roadway and new sidewalks on both sides of the road.

Obtaining the Bidding Documents

The Issuing Office is Wright-Pierce. Information and Bidding Documents for the Project can be found at the following designated website:

https://www.wright-pierce.com/projects

Bidding Documents may be downloaded from the designated website at a cost of **$60** per download.

To be considered a responsive Bidder, the Bidder shall have obtained at least one set of Bidding Documents from the Issuing Office using the name that is to appear on the Bid Form. The designated website will be updated periodically with addenda, lists of plan holders, reports, and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website. Neither Owner nor Engineer will be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the designated website. It is the Bidder's responsibility to check the designated website for addenda.

Pre-bid Conference

A pre-bid conference for the Project will be held on **Thursday, June 23, 2022** at **1:00 PM** at **Bath City Hall, 55 Front Street, Bath, ME 04530.** Attendance at the pre-bid conference is encouraged but not required.

Bid security shall be furnished in accordance with the Instructions to Bidders.

A bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum bid price and in the form of a certified check or Bid bond issued by surety meeting the requirements of the General Conditions. No bid may be withdrawn for at least 60 days after receipt of bids unless released by the Owner.

This contract is expected to be funded in part by the State of Maine Department of Environmental Protection (DEP) Clean Water State Revolving Loan Fund (CWSRF) program and United States Department of Agriculture (USDA) – Rural Utilities Services (RUS). Neither the State of Maine nor any of its departments, agencies, or employees is or will be a party to this contract. The word "agency" in the contract documents refers to the DEP and USDA.

The contractor must comply with the Disadvantaged Business Enterprises (DBE) SRF special requirements contained in the CWSRF Supplementary Conditions. Failure of the successful bidder to complete the pre-award requirements of this program may result in finding that the bidder is non-responsible and therefore not entitled to award of this contract.

For all further requirements regarding funding agency notifications, funding agency requirements, bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

The contractor must comply with all Federal Requirements per the CWSRF Supplementary Conditions.

The contractor must comply with Davis-Bacon (DB) and Davis-Bacon Related Acts (DBRA) as stated in the CWSRF Supplementary Conditions. All laborers and mechanics employed by the contractor and subcontractors on this project shall not be paid less than the prevailing wage rates contained in the wage determination published in the bidding documents. Any laborers and mechanics not listed in the wage determination shall be paid at least as much as the lowest wage rate for other similar trade classifications already contained in the wage determination published in the bidding documents. The successful bidder will be required to have an active System for Award Management (SAM) registration prior to award of the contract. The Owner and Engineer reserve the right to deem the successful bidder non-responsive if a SAM.gov registration is not obtained within seven calendar days of the Owner's notice of intent to award letter.

The contractor and subcontractors shall use the Elation Systems software, made available by the State of Maine Department of Environmental Protection, for uploading their certified weekly payroll. Payroll noncompliance and other related payroll issues identified by the software shall be resolved by the contractor/subcontractor in the software and in a timely manner to maintain compliance with Davis Bacon requirements throughout the project.

American Iron and Steel Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

The following waivers apply to this Contract:

- De Minimis,
- Minor Components,
- Pig iron and direct reduced iron.

The City of Bath reserves the right to reject any or all Bids, to waive any technical or legal deficiencies, and to accept any Bid that it may deem to be in the best interests of the City.

This Advertisement is issued by:

Owner: **The City of Bath**
By: **Lee Leiner**
Title: **Public Works Director**
Date: **June 15, 2022**

END OF SECTION

SECTION 00200

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

TABLE OF CONTENTS

ARTICLE 1—DEFINED TERMS

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

1.02 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 which registers plan holders.

Wright-Pierce

11 Bowdoin Mill Island, Suite 140

Topsham, ME 04086

E-mail: jan.wiegman@wright-pierce.com

Contact Name: Jan Wiegman, PE

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Deleted

2.05 Deleted

2.06 *Electronic Documents*

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf). It is the intent of the Engineer and Owner that such Electronic Documents are to be

exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

3.01 Deleted.

3.02 Deleted.

3.03 To demonstrate Bidder's qualifications to perform the Work, each Bidder must submit with its bid a completed Experience Statement (Section 00450) and such other data as may be called for below or in the Supplementary Conditions. Each Bid must contain evidence of the Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of contract.

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

3.05 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.06 To be considered a responsive Bidder, the Contractor shall have obtained at least one set of Bidding Documents from the Issuing Office. The Bid will not be awarded to a Bidder unless a record for obtaining at least one set of Bidding Documents exists in the Issuing Office. To meet this requirement and to establish the record of receipt, a prospective Bidder must obtain Bidding Documents using the name that is to appear on the Bid Form.

3.07 The Contractor and Subcontractors shall use the Elation System software; made available by the State of Maine Department of Environmental Protection, for uploading their certified weekly payroll. Payroll noncompliance and other related payroll issues identified by the software shall be resolved by the Contractor/Subcontractor in the software in a timely manner to maintain compliance with Davis Bacon Requirements throughout the project.

ARTICLE 4—PRE-BID CONFERENCE

4.01 Deleted

4.02 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to

discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.

4.03 Deleted

4.04 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 *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.

5.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:

a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.

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

c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in 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.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the

presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

A. In addition to the documents regarding the existing site conditions referred to in paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to the Owner and available in Appendix A:

1. Stone Pipe Memo

5.04 *Site Visit and Testing by Bidders*

A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.

B. A Site visit is scheduled immediately following the pre-bid conference to be held on June 23, 2022, 1:00 PM at Bath City Hall, 55 Front Street, Bath, ME 04530. Maps to the Site will be available at the pre-bid conference.

C. Bidders visiting the Site are required to arrange their own transportation to the Site.

D. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: Lee Leiner, Public Works Director. Bidder must conduct the required Site visit during normal working hours.

E. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

F. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

G. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

H. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the

Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

A. Lacey Kremer, PE, Wright-Pierce, email: lacey.kremer@wright-pierce.com Phone: 207-319-1517

7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven working days prior to the date for opening of Bids may not be answered. Addenda will be issued not later than five working days before the bid opening. Bidders are responsible for determining that they have received all Addenda issued.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents. Bid security must be at least 5% of the Bidder's maximum Bid price.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract 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, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that 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 Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

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

ARTICLE 9—CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

9.02 Deleted.

9.03 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 10—SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. Each such request shall include the Manufacturer's Certification for Compliance with AIS. Refer to the Manufacturer's Certification form provided in these construction Contract Documents. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner. Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.05 and 7.06 of the General Conditions after the Effective Date of the Contract. Each such request shall include Manufacturer's Certification letter to document compliance with AIS requirements of Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A – Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents

10.03 All prices that Bidder sets forth in its Bid will 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 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

11.02 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a 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.

11.03 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 and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, 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 subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.04 A Bid by a partnership must 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 must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder's name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

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

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

12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Lump Sum with Unit Prices and Alternates*

A. Bidders must submit a Bid on a lump sum basis for each lump sum item, and on a unit price basis for each unit price item of Work listed in the Bid Form for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

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

D. The total of all unit price "Bid Prices" and all lump sum items will be used by Owner for Bid comparison purposes.

13.02 *Allowances*

A. For cash allowances the Bid price must 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 13.02.B of the General Conditions.

ARTICLE 14—SUBMITTAL OF BID

14.01 Deleted.

14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must 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 must 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 must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be 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. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

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

ARTICLE 16—OPENING OF BIDS

16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid 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 opening of Bids.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 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 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 *Evaluation of Bids*

A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. Deleted

C. Deleted.

D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

E. Deleted.

F. Deleted.

18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

18.08 All protests arising from the Owner's procurement practices must be submitted to the Owner as soon as practical. Owner will investigate the basis for the protest, seek advice of legal

counsel, document all meeting and actions, and attempt to resolve the protest promptly and equitably. Maine DEP shall be notified of the status of any protests.

ARTICLE 19—BONDS AND INSURANCE

19.01 The successful bidder must submit Performance and Payment Bonds to the Owner prior to contract award. Detailed information can be found in the General Conditions. The successful bidder must submit Liability and Property Insurance certificates to the Owner prior to contract award. Detailed information can be found in the General Conditions and the Supplementary Conditions.

ARTICLE 20—SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 The Owner is exempt from Maine state sales and use taxes on all materials to be incorporated in the work. Said taxes shall not be included in the bid. Detailed information can be found in the General Conditions and the CWSRF Supplementary Conditions.

ARTICLE 22—CONTRACTS TO BE ASSIGNED

Not Used

ARTICLE 23—DELETION OF ITEMS

23.01 Owner reserves the right to reduce project scope by the elimination of Bid items, reduction of quantities on unit price Bid items, or deleting elements of lump sum Bid items. No adjustment to other Bid items prices will be permitted. In the case of reduction of quantities on unit price items, the unit price will not be adjusted. Such adjustments to project scope will be determined prior to award of the Contract and will be negotiated with the apparent Successful Bidder only. If such negotiations are not satisfactory to Owner, Owner will reject all Bids.

ARTICLE 24—FEDERAL REQUIREMENTS

24.01 If the contract price is in excess of $100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.

24.02 Federal requirements at Article 19 of the Supplementary Conditions apply to this Contract.

24.03 746 of Title VII of the Consolidated Appropriations Act of 2017 *(Division A – Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel

requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The deminimis and minor components waiver apply to this contract.

ARTICLE 25—SPECIAL LEGAL REQUIREMENTS

24.01 This contract is expected to be funded in whole or in part by the State of Maine Department of Environmental Protection (DEP) Clean Water State Revolving Loan Fund (CWSRF) program. Neither the State of Maine nor any of its departments, agencies, or employees is or will be a party to this contract. The word "agency" in the contract documents refers to the DEP and USDA.

24.02 Nondiscrimination in Employment: Each Bidder will be required to comply with the President's Executive Order No. 11246 and any amendments or supplements to this Executive Order.

24.03 The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 40 CFR part 33, Disadvantaged Business Enterprises (DBE), in the award and administration of subcontracts. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

1. During the bidding period, the Contractor is required to make the good faith efforts as described in the CWSRF Supplementary Conditions if they will be awarding subcontracts. Contractors should initiate solicitation efforts early in the bidding period.
2. The Contractor must comply with the following provisions when submitting their bid:
   (a) The contractor must complete and submit EPA Form 6100–4, 'DBE Program Subcontractor Utilization Form' (copy attached) as part of the prime contractor's bid or proposal package to the Owner. Note, only DBE subcontractors should be listed. If no DBE subcontractors are to be used, the contractor must still complete and submit the form.
   (b) The contractor must have each of its proposed DBE subcontractors complete the EPA Form 6100–3, 'DBE Program Subcontractor Performance Form' (copy attached). The completed forms must be submitted as part of the prime contractor's bid or proposal package to the Owner.
3. Prior to contract award, as the Successful Bidder, the Contractor must comply with the following provisions:
   (a) The contractor must submit to the Owner documentation of its good faith efforts (such as copies of solicitation letters and emails) and data relied upon in formulating its fair share objectives. Solicitation documentation must include proof of receipt. The records must be submitted to the Owner even if the goals were met.
   (b) The contractor must submit to the Owner a bidders list of all firms that bid or quote on subcontracts, including both MBE/WBEs and non-MBE/WBEs. The purpose of a bidders list is to provide contractors who conduct competitive bidding with as accurate a database as possible about the universe of MBE/WBE and non-MBE/WBE subcontractors. The list must include the following information:
      (1) Entity's name with point of contact;
      (2) Entity's mailing address, telephone number, and e-mail address;
      (3) The procurement on which the entity bid or quoted, and when; and
      (4) Entity's status as an MBE/WBE or non-MBE/WBE.

Additional information and forms may be found in the CWSRF Supplementary Conditions.

24.04 The eligibility of successful bidder will be verified through the federal government's Excluded Parties List System prior to Maine Department of Environmental Protection approval of the contract award. Furthermore, by entering into the contract, the contractor shall certify that no part of the contract shall be subcontracted to a Debarred or Suspended person or firm. Detailed information may be found in the CWSRF Supplementary Conditions.

24.05 Not used.

24.06 The contractor must comply with Davis-Bacon (D-B) and Davis-Bacon Related Acts (DBRA). All laborers and mechanics employed by the contractor and subcontractors on this project shall not be paid less than the prevailing wage rates contained in the wage determination published in these bidding documents. All laborers and mechanics not listed in the wage determination but employed by the contractor and subcontractors on this project shall be paid at least as much as the lowest wage rate for other similar trade classifications already contained in the wage determination published in these bidding documents. A form 1444 submission will be required to obtain additional employee rate classifications, after contract award. No allowances or extra considerations on behalf of any contractor or subcontractor will be permitted subsequently by reason of error or oversight on account of Department of Labor wage determinations. The contractor and subcontractors shall pay all employees weekly. The contractor and subcontractors shall submit weekly certified payrolls to the owner or designated representative, including a payroll summary with signed certification form WH-347. Detailed information and forms can be found in the CWSRF Supplementary Conditions.

The Contractor and subcontractors shall use Elation System software, made available by the State of Maine Department of Environmental Protection, for uploading their certified weekly payroll. Payroll noncompliance and other related payroll issues identified by the software shall be resolved by the contractor/subcontractor in the software and in a timely manner to maintain compliance with Davis Bacon requirements throughout the project.

24.07 The contractor must comply with all Federal requirements found in the CWSRF Supplementary Conditions.

24.08 All laborers and mechanics employed or working upon the construction site of the project shall be paid not less than the prevailing State minimum wage rate regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

24.09 The Contractor shall comply with the Use of American Iron and Steel in accordance with Public Law 113-76, Section 436. The law and its requirements and guidance, including certification forms, can be found in the SRF supplementary conditions.

END OF SECTION

SECTION 00410

BID FORM FOR CONSTRUCTION CONTRACT

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.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

City of Bath

55 Front Street

Bath, Maine 04530

Green Street Rehabilitation

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

ARTICLE 2—ATTACHMENTS TO THIS BID

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

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;

E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;

F. Required Bidder Qualification Statement with supporting data;

G. Signed Compliance Statement (Section 00460).

H. Signed Certification of Non-Segregated Facilities (SC-40).

I. Signed Labor Union Notice (SC-41).

J. If Bid amount exceeds $10,000, Signed Certification of Bidder Regarding Equal Employment Opportunity (Section 00406). [RD]

K. If Bid amount exceeds $25,000, Signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions, AD-1048 (Section 00408). [RD]

L. If Bid amount exceeds $100,000, Signed RD Instruction 1940-Q Exhibit A-1 Certification for Contracts, Grants and Loans (Section 00409). [RD]

M. A tabulation of Subcontractors, Suppliers and other persons and organizations required to be identified in this Bid.

N. Maine DEP Form 6100-4, "DBE Subcontractor Utilization Form"

O. Maine DEP Form 6100-3, "DBE Subcontractor Performance Form" for each proposed DBE subcontractor.

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Base Bid Items*

A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum, unit price and allowance items.

B. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and

2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents (estimated "*").

Item No.	Description	Unit	Quantity	Bid Unit Price	Bid Amount
1	Mobilization/Demobilization	LS	1	$	$
2	Traffic Control	LS	1	$	$
3	Erosion and Sediment Control	LS	1	$	$
4	Remove Tree and Stump, Backfill Loam and Seed	EA	4	$	$
5	Excavate and Dispose of Pavement and Earth Excavation	CY	620	$	$
6	Remove and Dispose of Concrete	CY	190	$	$
7	8-inch PVC Sewer Pipe	LF	1220	$	$
8	18-inch PVC Sewer Pipe	LF	25	$	$
9	4" Sanitary Service Connection	LF	350	$	$
10	4-foot Diameter Sewer Manhole	VF	45	$	$
11	Core Existing Manhole	EA	2	$	$
12	Pipe Trench Insulation	LF*	50	$	$
13	12-inch Storm Drain Pipe	LF	1200	$	$
14	4-foot Diameter Catch Basin	VF	30	$	$
15	4-foot Diameter Drain Manhole	VF	30	$	$
16	Protect Existing Trees	EA	4	$	$
17	Test Pit Excavation and Backfill	EA	5	$	$
18	Additional Earthwork - Excavation and Disposal	CY	50	$	$
19	Granular Fill	CY	50	$	$
20	Trench Ledge Excavation and Disposal	CY*	100	$	$
21	Type A Aggregate Base	CY	620	$	$
22	Type D Aggregate Base	CY	100	$	$
23	Reclaim Existing Pavement	SY	3500	$	$
24	19 MM Base Pavement	TON	550	$	$
25	12.5 MM Surface Pavement	TON	330	$	$
26	12.5 MM Hand Placed Pavement	TON	50	$	$
27	9.5 MM Hand Placed Pavement	TON	130	$	$
28	Precast Concrete Curb	LF	1900	$	$
29	Remove and Reset Granite Curb	LF	47	$	$
30	Granite Curb Radii	LF	95	$	$
31	Remove, Store, and Reset Signs	EA	10	$	$
32	Detectable Warning Panel	SF	48	$	$
33	1-foot Wide Painted Crosswalk Markings	LF	195	$	$
34	Hand Labor Straight time*	HR	24	$	$
35	All Purpose Excavator (Operator Incl)*	HR	8	$	$
36	Truck Large (Include Operator)*	HR	12	$	$
37	Foreperson*	HR	12	$	$
38	Loam and Seed	SY	1650	$	$
39	Remove Store and Reset Fence	LF	60	$	$
40	Common Borrow Fill	CY	30	$	$
41	Abandon Sewer Pipe (Flowable Fill)	CY	12	$	$
42	Allowance: Asphalt Adjustment	Allow	1	$ 9,000.00	$ 9,000.00
				Total Base Bid	$

ARTICLE 4—DELETED

ARTICLE 5—DELETED

ARTICLE 6—TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Deleted.

6.03 Deleted.

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

ARTICLE 7—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

7.01 *Bid Acceptance Period*

A. 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.

7.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

7.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 8—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

8.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work, including all American Iron and Steel requirements.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the

Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Bidder has considered the information known to Bidder itself; 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 Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder 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.

8. 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.

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

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

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

8.02 *Bidder's Certifications*

A. The Bidder certifies the following:

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

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

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

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

b. 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.

c. 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.

d. 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.

BIDDER hereby submits this Bid as set forth above:

Bidder:

_____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(typed or printed)

Address for giving notices:

_____

_____

Bidder's Contact:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Phone: _____

Email: _____

Address: _____

_____

_____

Bidder's Contractor License No.: (if applicable) _____

END OF SECTION

SECTION 00430

BID BOND (PENAL SUM FORM)

Bidder Name: Address *(principal place of business)*:	Surety Name: Address *(principal place of business)*:
Owner Name: Address *(principal place of business)*:	Bid Project *(name and location)*: Bid Due Date:
Bond Penal Sum: Date of Bond:	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder *(Full formal name of Bidder)* By: _____ *(Signature)* Name: _____ *(Printed or typed)* Title: _____ Attest: _____ *(Signature)* Name: _____ *(Printed or typed)* Title:	Surety *(Full formal name of Surety) (corporate seal)* By: _____ *(Signature) (Attach Power of Attorney)* Name: _____ *(Printed or typed)* Title: _____ Attest: _____ *(Signature)* Name: _____ *(Printed or typed)* Title:
Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.	

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

2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
   3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
   3.2. All Bids are rejected by Owner, or
   3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

END OF SECTION

SECTION 00450

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ Joint Venture comprised of the following companies:			
	1.		
	2.		
	3.		
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?	☐ Yes ☐ No ☐ Pending		
Identify all		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

1.03 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: ☐Yes ☐No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐Yes ☐No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐Yes ☐No		Limit of Authority:	$
Name:		Title:	

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
☐Disadvantaged Business Enterprise		
☐Minority Business Enterprise		
☐Woman-Owned Business Enterprise		
☐Small Business Enterprise		
☐Disabled Business Enterprise		
☐Veteran-Owned Business Enterprise		
☐Service-Disabled Veteran-Owned Business		
☐HUBZone Business (Historically Underutilized) Business		
☐Other		
☐None		

ARTICLE 4—SAFETY

4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:	

Safety Certifications		
Certification Name	Issuing Agency	Expiration

4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5—FINANCIAL

5.01 Provide information regarding the Business's financial stability. If required in the "Submit" check box below, provide a copy of the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:		
Business address:		
Date of Business's most recent financial statement:		☐ Submit
Date of Business's most recent audited financial statement:		☐ Submit
Financial indicators from the most recent financial statement		
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)		
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)		

ARTICLE 6—SURETY INFORMATION

6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location? ☐Yes ☐No			
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? ☐Yes ☐No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7—INSURANCE

7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location? ☐Yes ☐No			
Does provider have an A.M. Best Rating of A-VII or better? ☐Yes ☐No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 8—CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? ☐Yes ☐No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐Yes ☐No				
Been released from a bid in the past 5 years? ☐Yes ☐No				
Defaulted on a project or failed to complete any contract awarded to it? ☐Yes ☐No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐Yes ☐No				
Been a party to any currently pending litigation or arbitration? ☐Yes ☐No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.

B. Diverse Business Certifications if required by Paragraph 3.01.

C. Certification of Business's safety performance if required by Paragraph 4.02.

D. Financial statements as required by Paragraph 5.01.

E. Attachments providing additional information as required by Paragraph 8.02.

F. Schedule A (Current Projects) as required by Paragraph 8.03.

G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.

H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.

I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

Schedule A—Current Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

END OF SECTION

USDA
Form RD 400-6
(REV. 4-00)

Form Approved
OMB No. 0575-0018

SECTION 00460

COMPLIANCE STATEMENT

This statement relates to a proposed contract with

(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date: _____ _____

(Signature of Bidder or Prospective Contractor)

_____

Address (including Zip Code)

SECTION 00470

USDA DEBARMENT CERTIFICATION

U.S. DEPARTMENT OF AGRICULTURE

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participant's responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Resister (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name or Project Name

PR/Award Number

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

Form AD-1048 (1/92)

Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has- become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

SECTION 00471

RD INSTRUCTION 1940-Q

RD Instruction 1940-Q
Exhibit A-1

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____ _____

(name) (date)

_____

(title)

(08-21-91) PN 171

[NTS: THE REMAINDER OF THIS SECTION IS NOT PUT IN THE SPECIFICATIONS. HOWEVER, REVIEW THE FOLLOWING REGULATIONS REGARDING USE OF THIS SECTION]

RD Instruction
1940-Q

PART 1940 - GENERAL

Subpart Q - Restrictions on Lobbying

§1940.801 Purpose.

This subpart implements section 319 of Public Law 101-121, which prohibits applicants and recipients of Federal contracts, grants and loans from using appropriated funds for lobbying the Federal Government in connection with a specific award. Section 319 also requires that each person who requests or receives a Federal contract, grant, loan, or a Federal commitment to guarantee a loan, must disclose the expenditure of any funds, other than appropriated funds, for lobbying activities. This subpart provides administrative guidance regarding the information contained in U.S. Department of Agriculture's (USDA) 7 CFR part 3018 and Departmental Regulation (DR) 2400-5, which are attached as Exhibits A and B of this subpart.

§1940.802 [Reserved] (Revised 07-31-96, PN 264.)

§1940.803 Definitions.

In addition to the following, refer to the definitions in §3018.105 of Exhibit A of this subpart.

Appropriated funds. Federal funds received from any Federal agency for a purpose or purposes authorized by such agency.

Communication. Includes written, oral, electronic or other means of communications.

Receiving office. The State, District, or County Office that is the primary office responsible for processing an application.

§§1940.804 - 1940.809 [Reserved]

08-21-91) PN 171
RD Instruction 1940-Q

§1940.810 Certification for contracts, grants and loans.

(a) The Certification for Contracts, Grants and Loans, contained in Exhibit A-1 of this subpart, must be completed at the time an application or bid proposal is submitted by a person requesting a contract or grant exceeding $100,000, or a loan exceeding $150,000.

(b) Any person who requests or receives a contract, subcontract or subgrant exceeding $100,000 at any tier under a covered contract, grant or loan, must complete and submit a certification to the next higher tier.

(c) The certification completed by a person referred to in paragraph (a) of this section will be collected by the receiving office and filed in the case folder.

(d) Recipients of contracts, grants or loans, or their subs, who receive certifications from lower tier applicants or recipients shall file the certifications with documents related to the subaward, and shall make them available for Agency examination upon request.

(e) Refer to §3018.110 of Exhibit A of this subpart for additional information.

§1940.811 Statement for loan guarantees.

(a) The Statement for Loan Guarantees, contained in Exhibit A-2 of this subpart, must be completed by the lender at the time an application is filed for each loan exceeding $150,000.

(b) The statement will be collected by the receiving office and filed in the case folder.

(c) Refer to §3018.110 of Exhibit A of this subpart for additional information.

§1940.812 Disclosure of lobbying activities.

(a) Standard Form (SF) LLL, "Disclosure of Lobbying Activities," which is part of Exhibit A of this subpart, must be completed by a person requesting or receiving a Agency contract, grant, loan, or a Agency commitment to guarantee a loan, and who meets the following conditions:

(1) the award amount exceeds the threshold stated in §1940.810(a) or §1940.811(a) of this subpart; and

(2) the person has made or has agreed to make any payment, using funds other than appropriated funds, to influence or attempt to influence a decision in connection with that specific award.

(b) SF-LLL must also be completed by any person who requests or receives a contract, subcontract or subgrant at any tier under a covered contract, grant or loan, and who meets the following conditions:

(1) the award amount exceeds $100,000; and

(2) the person has made or has agreed to make any payment, using funds other than appropriated funds, to influence or attempt to influence a decision in connection with that specific award.

(c) Each person who meets all conditions of paragraph (a) or (b) of this section will submit a disclosure form at the time of the application or bid proposal, and, at the end of each calendar quarter in which there occurs an event as specified in §3018.110 (c) of Exhibit A of this subpart.

(d) All disclosure forms, including quarterly updates, will be collected in the receiving office. The forms completed by persons under paragraph (a) of this section will be submitted directly to the receiving office. Forms completed by persons under paragraph (b) of this section will be submitted to the next higher tier. They will then be forwarded from tier to tier until they reach the receiving office. The original completed form will be retained in the case folder. One copy will be forwarded to the State Director, and a second copy will be sent immediately to the following address:

USDA, Office of Operations
Procurement Division
Policy and Review Team
14th and Independence Ave., S.W.
Room 1575-S
Washington, D.C. 20250

(e) The information provided on this form cannot be used by the FmHA as a basis for denying Federal assistance.

(f) Refer to Exhibit B of this subpart for additional information.

§§1940.813 - 1940.819 [Reserved]

RD Instruction 1940-Q

§1940.820 Exceptions.

(a) The prohibition on the use of appropriated funds and disclosure requirements governing the use of funds, other than appropriated funds, do not apply to certain activities. These activities are described in Subparts B and C of Exhibit A of this subpart.

(b) Section 319 of P.L. 101-121 imposes no restrictions on the use of any funds for general lobbying; i.e., attempts to influence Congress or the Executive Branch with respect to a program, rather than a specific award. Such general lobbying need not be disclosed on SF LLL. However, Section 319 does not authorize lobbying otherwise restricted or prohibited by law.

§1940.821 Examples.

Several examples of activities addressed by this Instruction are contained in Exhibit C of this subpart. They are to be used for guidance purposes only.

§§1940.822 - 1940.839 [Reserved]

§1940.840 Penalties and enforcement.

(a) Failure to comply with the provisions of this subpart may result in civil penalties, as described in §3018.400 of Exhibit A of this subpart.

(b) The Administrator, FmHA, shall take such actions as are necessary to ensure that the provisions in Section 319 of P.L. 101-121 are vigorously implemented and enforced.

§§1940.841 - 1940.850 [Reserved]

Attachments: Exhibits A, A-1, A-2, B, and C

1940-Q Exhibit A-1 (moved to front page)

RD Instruction 1940-Q
Exhibit A-2

STATEMENT FOR LOAN GUARANTEES

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to guarantee a loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

(name)	(organization)
(title)	(date)

1940-Q Exhibit B not automated see manual
RD Instruction 1940-Q
Exhibit C

EXAMPLES OF ACTIVITIES ADDRESSED BY RD INSTRUCTION 1940-Q

1. [A] is an applicant for a $1,000,000 FmHA Rural Rental Housing Loan. [B] is an architectural firm retained by [A] for preliminary design studies. [A] has requested [B] to visit the FmHA State Office to discuss design options for use in developing an application.

This technical activity is specifically authorized for use of appropriated funds and does not need to be reported by [A] as a lobbying activity. However, if the visit includes any communication with FmHA officials on application issues that are not architecturally related, the activity is not exempt from the law.

2. [C] will be submitting a loan application in the amount of $149,000 for a community facility. [C] has paid, with its own funds, [D], a consultant, to visit the National Office to help expedite the application when it is received.

[C] will not be required to submit a certification nor a disclosure form because the loan amount is less than $150,000.

3. [E] is borrowing $2,000,000 from FmHA to construct a hospital. The construction contract with [F] is in the amount of $1,700,000. [F] has a mechanical subcontract with [G] in the amount of $150,000.

[E] must submit a certification to FmHA at the time of the application. [F] must submit its certificate with the proposed bid to [E]. [G], having a subcontract of more than $100,000, must submit a certificate to [F]. [E] and [F] will retain the certifications they received from the lower tier awardees.

4. [H] is a lender who has requested an 80 percent guarantee on a $175,000 guaranteed loan for applicant [I]. [I] submitted the loan application without a signed statement from [H] because the guaranteed portion of the loan (80% of $175,000) was less than $150,000.

The amount that determines whether or not a statement is required from the lender is the total guaranteed loan (amount obligated = $175,000); therefore, the application should have included a statement from [H]. [I] is not required to sign a certification.

5. [J] is a long time FmHA borrower who submitted a Form SF LLL because she paid [K], a lobbyist, with her own funds, to visit Washington in an attempt to persuade a Member of Congress to increase the Farmer Programs budget for the next fiscal year.

The disclosure form is not required when the lobbying activity involves a program and not a specific application or award.

SECTION 00510

NOTICE OF AWARD

Date of Issuance:
Owner: Owner's Project No.:
Engineer: Engineer's Project No.:
Project:
Contract Name:
Bidder:
Bidder's Address:

You are notified that Owner has accepted your Bid dated [date] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[Describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is $[Contract Price]. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

[Number of copies sent] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [number of copies sent] counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): [Describe other conditions that require Successful Bidder's compliance]

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

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: [Full formal name of Owner]
By *(signature)*: _____
Name *(printed)*: _____
Title: _____

Copy: Engineer

END OF SECTION

SECTION 00520

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between [name of contracting entity] ("Owner") and [name of contracting entity] ("Contractor").

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

Owner and Contractor hereby 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: Storm Drain separation with approximately 1,200 feet of new storm drain, 1,200 feet of new sewer line and the rehabilitation of Green Street (1,250 feet long) with a reclaimed and repaved 26' wide roadway and new sidewalks on both sides of the road.

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Green Street Rehabilitation

ARTICLE 3—ENGINEER

3.01 The Owner has retained Wright-Pierce ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by "Engineer".

ARTICLE 4—CONTRACT TIMES

4.01 *Time is 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.

4.03 *Contract Times: Days*

A. The Work will be substantially complete within 150 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within180 days after the date when the Contract Times commence to run. Work shall begin no later than January 1, 2023.

4.05 *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 and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. 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):

1. *Substantial Completion:* Contractor shall pay Owner $750 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.

2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $750 for each day that expires after such time until the Work is completed and ready for final payment.

4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

4.06 *Special Damages* – DELETED A.

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

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

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the last day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 95 percent of the value of the 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).

B. Upon Substantial Completion of the entire construction to be provided under the Contract Documents, Owner shall pay an amount sufficient to increase total payments to Contractor to 98 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 150 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

1. The final 2 percent of the value of the Work shall be retained for a period of one year from the date of Substantial Completion.

6.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

A. All amounts not paid when due will bear interest at the rate of prime plus 2 percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.

2. Bonds:

a. Performance bond (together with power of attorney).

b. Payment bond (together with power of attorney).

3. General Conditions.

4. Supplementary Conditions.

5. Specifications as listed in the table of contents of the project manual (copy of list attached).

6. Drawings (not attached but incorporated by reference) consisting of [number] sheets with each sheet bearing the following general title: Green Street Rehabilitation.

7. Addenda (numbers ____ to ____ , inclusive).
8. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid
9. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    b. Work Change Directives.
    c. Change Orders.

B. The Contract Documents listed in Paragraph 7.01.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 7.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

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

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and

performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. 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.

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

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

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

11. 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.

8.02 *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 8.02:

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

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

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

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

8.03 *Standard General Conditions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the

standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on [indicate date on which Contract becomes effective] (which is the Effective Date of the Contract).

Owner:	Contractor:
_____ *(typed or printed name of organization)*	_____ *(typed or printed name of organization)*
By: _____ *(individual's signature)*	By: _____ *(individual's signature)*
Date: _____ *(date signed)*	Date: _____ *(date signed)*
Name: _____ *(typed or printed)*	Name: _____ *(typed or printed)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed)*
	(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____ *(individual's signature)*	Attest: _____ *(individual's signature)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed)*
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
Designated Representative:	Designated Representative:
Name: _____ *(typed or printed)*	Name: _____ *(typed or printed)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed)*
Address:	Address:
_____	_____
_____	_____
_____	_____
Phone: _____	Phone: _____
Email: _____	Email: _____
(If [Type of Entity] is a corporation, attach evidence of authority to sign. If [Type of Entity] is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	License No.: _____ *(where applicable)*
	State: _____

END OF SECTION

SECTION 00550

NOTICE TO PROCEED

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

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [date Contract Times are to start] pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: [Select one of the following two alternatives, insert dates or number of days, and delete the other alternative.]

The date by which Substantial Completion must be achieved is [date for Substantial Completion, from Agreement], and the date by which readiness for final payment must be achieved is [date for readiness, from Agreement].

[or]

The number of days to achieve Substantial Completion is [number of days, from Agreement] from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of [date, calculated from commencement date above]; and the number of days to achieve readiness for final payment is [number of days, from Agreement] from the commencement date of the Contract Times, resulting in a date for readiness for final payment of [date, calculated from commencement date above].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner:	[Full formal name of Owner]
By *(signature)*:	
Name *(printed)*:	
Title:	
Date Issued:	

Copy: Engineer

END OF SECTION

SECTION 00610

PERFORMANCE BOND

Contractor Name: [Full formal name of Contractor] Address *(principal place of business)*: [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address *(principal place of business)*: [Address of Surety's principal place of business]
Owner Name: [Full formal name of Owner] Mailing address *(principal place of business)*: [Address of Owner's principal place of business]	Contract Description *(name and location)*: [Owner's project/contract name, and location of the project] Contract Price: [Amount from Contract] Effective Date of Contract: [Date from Contract]

Bond

Bond Amount: [Amount]

Date of Bond: [Date]

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

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

14. Definitions

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

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

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

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

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

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

16. Modifications to this Bond are as follows: [Describe modification or enter "None"]

END OF SECTION

SECTION 00615

PAYMENT BOND

Contractor Name: [Full formal name of Contractor] Address *(principal place of business)*: [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address *(principal place of business)*: [Address of Surety's principal place of business]
Owner Name: [Full formal name of Owner] Mailing address *(principal place of business)*: [Address of Owner's principal place of business]	Contract Description *(name and location)*: [Owner's project/contract name, and location of the project] Contract Price: [Amount, from Contract] Effective Date of Contract: [Date, from Contract]
Bond Bond Amount: [Amount] Date of Bond: [Date] *(Date of Bond cannot be earlier than Effective Date of Contract)* Modifications to this Bond form: ☐ None ☐ See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.

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

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

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

16. Definitions

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

        16.1.1. The name of the Claimant;

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

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

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

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

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

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

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

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

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

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

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

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

18. Modifications to this Bond are as follows: [Describe modification or enter "None"]

END OF SECTION

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, “Paragraph SC-4.05.”

CONTENTS OF SUPPLEMENTARY CONDITIONS

DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

SC-1.01.A.3 APPLICATION FOR PAYMENT

Add the following language to the end of Paragraph 1.01.A.3:

The Application for Payment form to be used on this Project is EJCDC No. C-620 or similar approved format. The Agency must approve all Applications for Payment before payment is made.

SC-1.01.A.8 CHANGE ORDER

Add the following language to the end of Paragraph 1.01.A.8:

The Change Order form to be used on this Project is EJCDC No. C-941. Agency approval is required before Change Orders are effective.

SC-1.01.A.22 ENGINEER

Add the following language to the end of Paragraph 1.01.A.22:

The Engineer's Consultants on this Project are as follows: None

SC-1.01 A.30 OWNER

Add the following at the end of Paragraph 1.01.A.30 of the General Conditions:

Owner is referred to as Grantee in certain sections of these Contract Documents. Owner and Grantee are one and the same. For the purposes of Rural Development, this term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the federal programs.

SC-1.01 A.50 WORK CHANGE DIRECTIVE

Add the following language at the end of Paragraph 1.01.A.50

The Work Change Directive form to be used on this Project is EJCDC C-940 (2018). Agency approval is required before a Work Change Directive is issued. A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC-1.01 A.51 AGENCY

Add the following new paragraph after Paragraph 1.01.A.50

51. Agency – The Project is financed in whole or in part by the State of Maine Department of Environemtnal Protection (DEP) Clean Water State Revolving Fund (CWSRF) program and USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The word "agency" in the Contract Documents refers to the DEP and USDA.

SC-1.01 A.52 AMERICAN IRON AND STEEL DEFINITIONS

Add the following paragraph immediately after Paragraph 1.01.A.51 of the General Conditions, which is to read as follows:

52. American Iron and Steel Definitions

a. *American Iron and Steel (AIS)* - Requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for "iron and steel products," meaning the following products, if made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints,

valves, structural steel, reinforced precast concrete, and Construction Materials. AIS requirements apply in each of the several states, the District of Columbia, and each federally recognized Tribe, but not the U.S. Territories.

b. *Coating* - A covering that is applied to the surface of an object. If a Coating is applied to the external surface of a domestic iron or Steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any Coating processes that are applied to the external surface of Iron and Steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the Coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to Coatings on the external surface of Iron and Steel components. It does not apply to Coatings or linings on internal surfaces of Iron and Steel products, such as the lining of lined pipes. All Manufacturing Processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

c. *Construction Materials* - Those articles, materials, or supplies made primarily of iron and/or steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". Note: Mechanical and electrical components, equipment and systems are not considered Construction Materials. See definitions of Mechanical Equipment and Electrical Equipment.

d. Contractor's Certification - Documentation submitted by the Contractor upon Substantial Completion of the Contract that all Iron and Steel products installed were Produced in the United States.

e. *De Minimis* - Various miscellaneous, incidental low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of De Minimis components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for such De Minimis components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

f. *Electrical Equipment* - Typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does not apply to Electrical Equipment.

g. *Engineer's Certification* - Documentation submitted by the Engineer that Drawings, Specifications, and Bidding Documents comply with AIS.

h. *Iron and Steel products* - The following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. Only items on the above

list made primarily of iron or steel, permanently incorporated into the project must be Produced in the United States. For example, trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. iron or steel.

i. *Manufacturer* - A Supplier, fabricator, distributor, materialman, or vendor is an entity with which the Owner, Contractor or any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the Owner, Contractor or a subcontractor.

j. *Manufacturer's Certification* - Documentation provided by the Manufacturer stating that the Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. If items are purchased via a Supplier, distributor, vendor, etc. from the Manufacturer directly, then the Supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certifications to the parties purchasing the products.

k. *Manufacturing Processes* - Processes such as melting, refining, pouring, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic Iron and Steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a Coating are similarly not covered. Non-iron or Steel components of an Iron and Steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-Iron and Steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

l. *Mechanical Equipment* - Typically equipment which has motorized parts and/or is powered by a motor. AIS does not apply to Mechanical Equipment.

m. *Minor Components* - Components within an iron and/or Steel product otherwise compliant with the American Iron and Steel requirements; this waiver is typically used by Manufacturers. It differs from the De Minimis definition in that De Minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver allows use of non-domestically produced miscellaneous Minor Components comprising up to five percent of the total material cost of an otherwise domestically produced Iron and Steel product. However, unless a separate waiver for a product has been approved, all other Iron and Steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements only Minor Components within said product and the iron or Steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of Minor Components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low-cost items such as small fasteners etc.

n. *Municipal Castings* - Cast iron or Steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components

incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

o. *Primarily Iron or Steel* - A product is made of greater than 50 percent iron or Steel on a materials cost basis. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and/or steel, the AIS requirements do not apply. For example, the cost of a fire hydrant includes:

   1) The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and

   2) The cost to pour and cast to create those components (e.g. labor and energy).

   3) Not included in the cost are:

   4) The additional material costs for the non-iron or Steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and

   5) The cost to assemble the internal workings into the hydrant body.

p. *Produced in the United States* - The production in the United States of the iron or Steel products used in the project requires that all Manufacturing Processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

q. *Reinforced Precast Concrete* – Reinforced Precast Concrete structures must comply with AIS, regardless of whether it consists of at least 50 percent iron or steel. The reinforcing bar and wire must be Produced in the United States and meet the same standards as for any other iron or Steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered Construction Materials and must be Produced in the United States.

r. *Steel* - An alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of Steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of Steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

s. *Structural Steel* - Rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

SC-1.01 A.53 NON-RESIDENT CONTRACTOR

Add the following paragraph immediately after Paragraph 1.01.A.52 of the General Conditions, which is to read as follows:

53. Non-Resident Contractor -

a. A person who is not a resident in the State where the proposed construction is to be located, or

b. Any partnership that has no member thereof resident in the State where the proposed construction is to be located.

c. Any corporation established under laws other than those of the State in which the proposed construction is located.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

Add a new paragraph immediately after Paragraph 2.01.C of the General Conditions, which is to read as follows:

D. *Non-Resident Contractor*: The Contractor, if a corporation established under laws other than the State in which the proposed construction is located, shall file with the Owner, notice of the name of its resident attorney, appointed as required by the laws of the State in which the proposed construction is located. The Contractor, if a resident of a State other than that in which the proposed construction is located and not a corporation, shall file, at the time of execution of the Agreement, with the Owner a written appointment of a resident of the State in which the construction is located, having an office or place of business therein, to be his/her true and lawful attorney upon whom all lawful processes in any actions or proceedings against him/her may be served; and in such writing, which shall set forth said attorney's place of residence, shall agree that any lawful process against him/her which is served on said attorney shall be of the same legal force and validity as if served on him/her and that the authority shall continue in force so long as any liability remains outstanding against him/her in said State. The power of attorney shall be filed in the office of the Secretary of State if required, and copies certified by the Secretary shall be sufficient evidence thereof. Such appointment shall continue in force until revoked by an instrument in writing, designating in a like manner some other person upon whom such processes may be served, which instrument shall be filed in the manner provided herein for the original appointment.

2.02 *Copies of Documents*

SC-2.02 Delete Paragraph 2.02.A. in its entirety and replace with the following paragraph:

Owner shall furnish to Contractor 5 printed copies of the Contract Documents (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional copies will be furnished upon request at the cost of reproduction.

2.06 *Electronic Transmittals*

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

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

1. *Basic Requirements*

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

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

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

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

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

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

2. *System Infrastructure for Electronic Document Exchange*

a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.

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

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

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

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

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

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

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

g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the

Electronic Document or use an alternative delivery method to complete the communication.

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

1) Describe the period of time during which the Project Website will be operated and be available for reliance by the parties;

2) Provide any minimum system infrastructure, software licensing and security standards for access to and use of the Project Website;

3) Describe the types and extent of services to be provided at the Project Website (such as large file transfer, email, communication and document archives, etc.); and

4) Include any other Project Website attributes that may be pertinent to Contractor's use of the facility and pricing of such use.

C. *Software Requirements for Electronic Document Exchange; Limitations*

1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.

a. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.

2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

No changes in this Article.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

SC-4.01 Delete the last sentence of Paragraph 4.01.A

4.03 Reference Points

SC-4.03 Add a new paragraph immediately after Paragraph 4.03A of the General Conditions which is to read as follows:B. Engineer may check the lines, elevations, reference marks, batter boards, etc., set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate construction of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.

4.05 *Delays in Contractor's Progress*

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

5. *Weather-Related Delays*

a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered abnormal weather conditions. Requests for time extensions due to abnormal weather conditions will be submitted to the Engineer within five days of the end of the abnormal weather condition event. It is the responsibility of the Contractor to provide the information listed in this Section.

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

No changes in this article.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2010, 2013, or 2018 edition).

2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2010, 2013, or 2018 edition).

6.03 *Contractor's Insurance*

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional

insureds (in addition to Owner and Engineer) the following: Engineer's Consultants, as specifically identified in Article 1

E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Jones Act (if applicable)	
Bodily injury by accident—each accident	N/A
Bodily injury by disease—aggregate	N/A
Employer's Liability	
Each accident	$500,000
Each employee	$500,000
Policy limit	$500,000
Stop-gap Liability Coverage	
For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	N/A

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

1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
2. damages insured by reasonably available personal injury liability coverage, and
3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.
    a. Such insurance must be maintained for three years after final payment.

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

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

3. Severability of interests and no insured-versus-insured or cross-liability exclusions.

4. Underground, explosion, and collapse coverage.

5. Personal injury coverage.

6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

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

H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).

2. Any exclusion for water intrusion or water damage.

3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.

4. Any exclusion of coverage relating to earth subsidence or movement.

5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).

6. Any limitation or exclusion based on the nature of Contractor's work.

7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	$2,000,000
Products—Completed Operations Aggregate	$2,000,000
Personal and Advertising Injury	$1,000,000
Bodily Injury and Property Damage—Each Occurrence	$1,000,000

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

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	$500,000
Each Accident	$1,000,000
Property Damage	
Each Accident	$1,000,000

K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	$1,000,000
General Aggregate	$2,000,000

N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

Contractor's Professional Liability	Policy limits of not less than:
Each Claim	$
Annual Aggregate	$

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

F. *Builder's Risk Requirements:* The builder's risk insurance must:

1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and

artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).

a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.

b. 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 will be provided through other insurance policies acceptable to Owner and Contractor.

2. 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.

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

4. 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).

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

6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.

7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.

8. include performance/hot testing and start-up, if applicable.

9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.

10 include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, include as insureds the following:

a. Engineer and Engineer's consultants as listed in SC-1.01.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.03 *Labor; Working Hours*

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be 7:00 AM to 5:00 PM, Monday through Friday.
2. Owner's legal holidays are State mandated holidays.

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:

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

SC-7.04 Add the following new paragraph immediately after Paragraph 7.04.D:

E. All Iron and Steel products must meet American Iron and Steel requirements.

F. For projects utilizing a De Minimis waiver, Contractor shall maintain an itemized list of non-domestically produced iron or steel incidental components and ensure that the cost is less than 5% of total materials cost for project.

SC-7.05 *"Or Equals"*

Modify Paragraph 7.05A as follows:

Amend the third sentence of Paragraph 7.05A by striking out the following words: Unless the specifications or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted.

Amend the last sentence of Paragraph 7.05.A.1.a.3 by striking out "and;" and adding a period at the end of Paragraph 7.05.A.1.a.3.

Delete Paragraph 7.05.A.1.a.4 in its entirety and insert the following in its place: [Deleted]

Add the following at the end of Paragraph 7.05.B

Contractor shall include a Manufacturer's Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

Add a new subparagraph SC-7.05.B.1 immediately after subparagraph 7.05.B:

1. It shall be Contractor's responsibility to coordinate all submittals to Engineer for approval to eliminate any conflicts which might arise due to the use of "or equal" items. Any additional costs incidental to the use of "or equal" items shall be paid by Contractor.

SC-7.06 *Substitutes*

Modify Paragraph 7.06A as follows:

Remove "and" from end of Paragraph 7.06.A.3.a.2

Add "; and" to the end of Paragraph 7.06.A.3.a.3

Add the following new paragraph immediately after Paragraph 7.06.A.3.a.3:

4. Comply with American Iron and Steel by providing Manufacturer's Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

Add a new subparagraph SC-7.06.E.1 immediately after subparagraph 7.06.E:

1. It shall be Contractor's responsibility to coordinate all submittals to Engineer for approval to eliminate any conflicts which might arise due to the use of substitutes. Any additional costs incidental to the use of substitutes shall be paid by Contractor.

SC-7.07 Concerning Subcontractors and Suppliers

Amend Paragraph 7.07.A by adding the following to the end of the paragraph:

The total amount of work subcontracted by the Contractor shall not exceed fifty percent of the Contract price without prior approval from the Owner, Engineer and Agency.

Delete Paragraph 7.07.B in its entirety and insert [Deleted].

Amend Paragraph 7.07.E by deleting the second sentence of the paragraph and insert the following in its place: "Owner may not require that Contractor use a specific replacement."

7.10 *Taxes*

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

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

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-7.12 Record Documents

Amend the paragraph by adding the following after "written interpretations and clarifications,": Manufacturer certifications,SC-7.13 Safety and Protection

Insert the following after the second sentence of Paragraph 7.13.G:

The following Owner safety programs are applicable to the Work: Hazard Analysis Procedure

SC 7.16 Submittals

Amend Paragraph 7.16.A.1.c by deleting the last period and adding:

, including Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

Add new paragraph immediately after Paragraph 7.16.C.8

9. Engineer's review and approval of a Shop Drawing or Sample shall include review of Manufacturers' Certifications in order to document compliance with American Iron and Steel requirements, as applicable.

SC-7.17 Contractor's General Warranty and Guarantee

Add a new paragraph immediately after Paragraph 7.17.E:

F. Contractor shall certify upon Substantial Completion that all Work and Materials have complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor's Certification Letter provided in these Contract Documents..

ARTICLE 8—OTHER WORK AT THE SITE

No changes to this Article.

ARTICLE 9—OWNER'S RESPONSIBILITIES

No changes to this Article.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.03 *Resident Project Representative*

SC-10.03 Add the following new paragraph immediately after Paragraph 10.03.B:

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

b. Observe whether any Work in place appears to be defective.

c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

a. Participate in Engineer's visits regarding Substantial Completion.

b. Assist in the preparation of a punch list of items to be completed or corrected.

c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

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

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11—CHANGES TO THE CONTRACT

11.02 Change Orders

SC-11.02 Add the following new paragraph after Paragraph 11.02.B:

C. The Engineer or Owner shall contact the Agency for concurrence on each Change Order prior to issuance. All Contract Change Orders must be concurred in by Agency before they are effective.

11.03 Work Change Directives

SC-11.03 Add new Paragraph 11.03.A.2 immediately after Paragraph 11.03.A:

1. The Engineer or Owner shall contact the Agency for concurrence on each Work Change Directive prior to issuance. Once authorized by Owner, a copy of each Work Change Directive shall be provided by Engineer to the Agency.

11.05 Owner-Authorized Changes in the Work

SC-11.05 Add the following at the end of Paragraph 11.05.B

For Owner-authorized changes in the Work, the Contractor will provide the Manufacturer's Certification(s) for materials subject to American Iron and Steel requirements except when sole-source is specified, in which case the Engineer will provide the Manufacturer's Certification(s).

11.09 Change Proposals

SC-11.09 Add new paragraph immediately after Paragraph 11.09.B.2.b:

c. Change orders involving materials subject to American Iron and Steel requirements shall include supporting data (name of Manufacturer, city and state where the product was manufactured, description of product, signature of authorized Manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

ARTICLE 12—CLAIMS

No changes to this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

SC 13.02 ALLOWANCES

Delete Paragraph 13.02.C in its entirety and insert the following in its place: "[Deleted]"

SC-13.03 UNIT PRICE WORK

SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. *Adjustments in Unit Price*

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

a. the extended price of a particular item of Unit Price Work amounts to five percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than twenty-five percent from the estimated quantity of such item indicated in the Agreement.

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

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

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

14.03 Defective Work

SC 14.03 Add new paragraph immediately after Paragraph 14.03.F

G. Installation of materials that are non-compliant with American Iron and Steel requirements shall be considered defective work.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

SC-15.01 PROGRESS PAYMENTS

SC-15.01 Add the following language at the end of Paragraph 15.01.B.4:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage or invest the retainage for the benefit of the Contractor.

SC-15.01 Add new paragraph immediately after Paragraph 15.01.B.4:

5. The Application for Payment form to be used on this Project is EJCDC C-620. The Agency must approve all Applications for Payment before Payment is made.

SC-15.01 Add new paragraph immediately after Paragraph 15.01.B.5:

6. By submitting an Application for Payment based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials are compliant with American Iron and Steel requirements. Manufacturer's Certification letter for materials satisfy this requirement. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC-15.01 Add the following paragraph immediately after Paragraph 15.01.C.2.c:

a. The materials presented for payment in an Application for Payment comply with American Iron and Steel requirements.

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

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph

15.01.E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-15.01 Add the following new paragraph after Paragraph 15.01.B.2: For All Stored Materials:

i. The Contractor shall submit the Manufacturer's short-term and long-term storage and shall have established a written program to implement the Manufacturer's required storage procedures, including written schedule for all required maintenance activities.
ii. For each payment requisition that includes payment for stored materials, Contractor shall include the following documentation:
    1) Identification of the item(s), including model number, serial number and photographs.
    2) Copy of the updated maintenance schedule including certification that all required maintenance has been performed.
    3) Lien waivers for the preceding monthly payments.
iii. Contractor shall furnish evidence that payment for stored materials has in fact been paid to the respective supplier(s) within sixty days of payment by Owner. Failure to provide such evidence of payment may result in the withdrawal of previous approval(s) and removal of the cost of related materials and equipment from the next submitted Application for Payment.

b. For Off-Site Stored Materials:
i. Payment for off-site stored materials will be determined on a case-by-case basis at the discretion of the Owner and, if considered acceptable by Owner, the off-site facility shall be no more than 2 hours from the job site by car.
ii. Contractor shall provide the Owner and/or Engineer guaranteed right-of-entry to the storage facility to inspect the stored materials. Contractor shall be responsible for paying travel costs and Engineer's time associated with inspections.
iii. Contractor's Builder's Risk certificate of insurance shall explicitly identify the off-site storage location as well as transportation of stored materials from the storage facility to the job site.

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

1. Twenty 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.

SC-15.02 CONTRACTOR'S WARRANTY OF TITLE

Amend Paragraph 15.02.A by striking out the following text: "7 days after".

SC-15.03 SUBSTANTIAL COMPLETION

SC-15.03 Modify Paragraph 15.03.A by adding the following after the last sentence:

Contractor shall also submit the General (Prime) Contractor's Certification of Compliance certifying that to the best of the Contractor's knowledge and belief all substitutes, equals, and all Iron and Steel products proposed in the Shop Drawings, Change Orders, and Partial Payment Estimates, and those installed for the Project, are either Produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

SC-15.03 Add the following to the end of the Paragraph 15.03.C:

1. Substantial Completion shall only be granted for the Milestones identified in the Agreement.

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

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

15.04 Add the following new paragraph after Paragraph 15.04.A and related subparagraphs:

B. Owner and Engineer define the phrase "a separately functioning and usable part of the Work that can be used by the Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work" as meaning the following:

1. Equipment system start-up and demonstration testing shall be completed and documented. Equipment shall be demonstrated to operate in the manual and automatic modes. The equipment system shall consist of <u>all</u> equipment and appurtenances serving the same function. Equipment alarms shall be confirmed to dial out via the Owner's alarm system.
2. All relevant operation and maintenance manual submittals are completed.
3. All relevant Owner training is completed and documented.
4. All equipment safety-related items (e.g., equipment guards, handrails, ESTOPs, etc.) shall be completed, demonstrated and documented.
5. All relevant ventilation system start-up, balancing, testing and training have been completed and documented.
6. All relevant electrical systems are completed and documented (e.g., megger test reports, grounding report, VFD settings, circuit breaker settings, etc.).
7. Spare parts are transferred and documented.

C. If the above conditions are met, then the Owner will consider Partial Use or Occupancy with the following conditions:

1. The structures, equipment system and appurtenances shall remain fully covered under the Contractor's Builder's Risk policy.
2. Any damages, complications and consequences resulting from other on-going construction activities shall be addressed by the Contractor.
3. The operation and maintenance activities associated with the equipment system and appurtenances shall be performed by the Owner; however, the Contractor shall provide a reasonable amount of assistance when requested by the Owner.
4. Final clean-up and touch up coatings shall be completed prior to Substantial Completion.
5. No reduction in retainage will be made.
6. [The mechanical warranty on the equipment system and appurtenances shall begin.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No changes in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

No changes in this Article.

ARTICLE 18—MISCELLANEOUS

No changes in this Article.

SC-19 Add the following new Article 19 immediately after Article 18:

ARTICLE 19—FEDERAL REQUIREMENTS

19.01 *Agency Not a Party*

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees, is a party to this Contract.

19.02 *Contract Approval*

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the "Certificate of Owner's Attorney" (Exhibit A of this Bulletin) before Owner submits the executed Contract Documents to Agency for approval.

B. Agency concurrence is required on both the Bid and the Contract before the Contract is effective.

19.03 *Conflict of Interest*

A. Contractor may not knowingly contract with a Supplier or Manufacturer if the individual or entity who prepared the Drawings and Specifications has a corporate or financial affiliation with the Supplier or Manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest or other interest in or a tangible personal benefit from the Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

19.04 *Gratuities*

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this

Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

19.05 *Small, Minority, and Women's Businesses*

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor will take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. Affirmative steps will include:

1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;

4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;

5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

19.06 *Anti-Kickback*

A. Contractor shall comply with the Copeland Anti-Kickback Act (40 USC 3145) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

19.07 *Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended*

A. Contractor to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

19.08 *Equal Employment Opportunity*

A. The Contract is considered a federally assisted construction contract. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

19.09 *Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)*

A. Contractors that apply or bid for an award exceeding $100,000 must file the required certification (RD Instruction 1940-Q Exhibit A-1). The Contractor certifies to the Owner and every subcontractor certifies to the Contractor that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining the Contract if it is covered by 31 U.S.C. 1352. The Contractor and every subcontractor must also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

19.10 *Environmental Requirements*

A. When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:

1. Wetlands – When disposing of excess, spoil, or other Construction Materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

2. Floodplains – When disposing of excess, spoil, or other Construction Materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.

3. Historic Preservation - Applicants shall ensure that Contractors maintain a copy of the following inadvertent discovery plan onsite for review:

a. If during the course of any ground disturbance related to any Project, any post review discovery, including but not limited to, any artifacts, foundations, or other indications of past human occupation of the area are uncovered, shall be protected by complying with 36 CFR § 800.13(b)(3) and (c) and shall include the following:

i) All Work, including vehicular traffic, shall immediately stop within a 50 ft. radius around the area of discovery. The Contractor shall ensure barriers are established to protect the area of discovery and notify the Engineer to contact the appropriate RD personnel. The Engineer shall engage a Secretary of the Interior (SOI) qualified professional archeologist to quickly assess the nature and scope of the discovery; implement interim

measures to protect the discovery from looting and vandalism; and establish broader barriers if further historic and/or precontact properties, can reasonably be expected to occur.

ii) The RD personnel shall notify the appropriate RD environmental staff member, the Federal Preservation Officer (FPO), and State Historic Preservation Office(SHPO) immediately. Indian tribe(s) or Native Hawaiian Organization (NHOs) that have an interest in the area of discovery shall be contacted immediately. The SHPO may require additional tribes or NHOs who may have an interest in the area of discovery also be contacted. The notification shall include an assessment of the discovery provided by the SOI qualified professional archeologist.

iii) When the discovery contains burial sites or human remains, the Contractor shall immediately notify the appropriate RD personnel who will contact the RD environmental staff member, FPO, and the SHPO. The relevant law enforcement authorities shall be immediately contacted by onsite personnel to reduce delay times, in accordance with tribal, state, or local laws including 36 CFR Part 800.13; 43 CFR Part 10, Subpart B; and the Advisory Council on Historic Preservation's Policy Statement Regarding treatment of Burial Sites, Human Remains, or Funerary Objects (February 23, 2007).

iv) When the discovery contains burial sites or human remains, all construction activities, including vehicular traffic shall stop within a 100 ft. radius of the discovery and barriers shall be established. The evaluation of human remains shall be conducted at the site of discovery by a SOI qualified professional. Remains that have been removed from their primary context and where that context may be in question may be retained in a secure location, pending further decisions on treatment and disposition. RD may expand this radius based on the SOI professional's assessment of the discovery and establish broader barriers if further subsurface burial sites, or human remains can reasonably be expected to occur. RD, in consultation with the SHPO and interested tribes or NHOs, shall develop a plan for the treatment of native human remains.

v) Work may continue in other areas of the undertaking where no historic properties, burial sites, or human remains are present. If the inadvertent discovery appears to be a consequence of illegal activity such as looting, the onsite personnel shall contact the appropriate legal authorities immediately if the landowner has not already done so.

vi) Work may not resume in the area of the discovery until a notice to proceed has been issued by RD. RD shall not issue the notice to proceed until it has determined that the appropriate local protocols and consulting parties have been consulted.

vii) Inadvertent discoveries on federal and tribal land shall follow the processes required by the federal or tribal entity.

4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

5. Mitigation Measures – The following environmental mitigation measures are required on this Project: No trees greater than 3" dbh shall be cut between June 1st and July 13st.

19.11 *Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)*

A. Where applicable, for contracts awarded by the Owner in excess of $100,000 that involve the employment of mechanics or laborers, the Contractor will comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, the Contractor will compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic will be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

19.12 *Debarment and Suspension (Executive Orders 12549 and 12689)*

A. A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

19.13 *Procurement of recovered materials*

A. The Contractor will comply with 2 CFR Part 200.322, "Procurement of recovered materials."

19.14 *American Iron and Steel*

A. Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

B. The following waivers apply to this Contract:

1. *De Minimis,*
2. Minor Components,
3. Pig Iron and direct reduced iron.

END OF SECTION

EXHIBIT A—CERTIFICATE OF OWNER'S ATTORNEY

PROJECT NAME: _____

CONTRACTOR NAME: _____

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows: I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

_____

Name Date

AGENCY CONCURRENCE

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

_____

Agency Representative Date

_____

Name

SECTION SC-23

AMERICAN IRON AND STEEL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. In accordance with P.L. 113-76, Consolidated Appropriations Act, 2014, this project includes the requirement for American Iron and Steel (AIS). For the purposes of this project, iron and steel products shall be as defined herein.

1.2 DEFINITIONS

A. Iron and Steel: For a product to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

Steel means an alloy that includes at least 50 percent iron, between 0.02% and 2% carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. This definition of steel includes carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

B. Iron and Steel Products: refers to the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

Only the products listed herein made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example, trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and data acquisition (SCADA), membrane bioreactor systems,

membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

C. Production: Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating.

Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the 7 material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

PART 2 - PRODUCTS

2.1 GENERAL

A. Iron and steel products shall include the following:
Lined or unlined pipes or fittings;
Manhole Covers
Municipal Castings (defined in more detail below)
Hydrants
Tanks
Flanges
Pipe clamps and restraints
Valves
Structural steel (defined in more detail below)
Reinforced precast concrete
Construction materials (defined in more detail below)

2.2 MUNICIPAL CASTINGS

A. Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

Access Hatches
Ballast Screen
Benches (Iron or Steel)
Bollards
Cast Bases
Cast Iron Hinged Hatches, Square and Rectangular
Cast Iron Riser Rings
Catch Basin Inlet
Cleanout/Monument Boxes
Construction Covers and Frames
Curb and Corner Guards
Curb Openings
Detectable Warning Plates
Downspout Shoes (Boot, Inlet)
Drainage Grates, Frames and Curb Inlets
Inlets
Junction Boxes
Lampposts
Manhole Covers, Rings and Frames, Risers
Meter Boxes
Service Boxes
Steel Hinged Hatches, Square and Rectangular
Steel Riser Rings
Trash receptacles
Tree Grates
Tree Guards
Trench Grates
Valve Boxes, Covers and Risers

2.3 STRUCTURAL STEEL

A. Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

2.4 CONSTRUCTION MATERIALS

A. Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors,

and stationary screens.

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin. For reinforced concrete cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

PART 3 - EXECUTION

3.1 CERTIFICATION

A. The Contractor, through its subcontractors, suppliers and manufacturers shall provide written certification to create a paper trail that documents the location of the manufacturing process involved with the production of iron and steel materials. Each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products shall certify that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin.

At a minimum, the certification shall include the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached at the end of this section are sample certifications. These certifications should be submitted to the Owner through the Contractor.

3.2 INSTALLATION

A. All iron and steel products, as defined herein, shall be produced in the United States in accordance with the American Iron and Steel requirements of the Consolidated Appropriations Act 2014. If a potentially non-compliant product is installed in the permanent work, the will be required to remove the non-domestic item from the project.

EXAMPLE LETTER FOR AIS CERTIFICATION COMPLIANCE

Documentation must be provided on company letterhead.

Date
Company Name
Company Address
City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:
1.
2.
3.

Such process took place at the following location:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

EXAMPLE LETTER FOR AIS CERTIFICATION COMPLIANCE

Documentation must be provided on company letterhead.

Date
Company Name
Company Address
City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:
1.
2.
3.

Such process took place at the following location:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

END OF SECTION

SECTION SC-32

WAGE RATES

Davis-Bacon Act

This project is funded in whole or in part by a State Revolving Fund loan and therefore is subject to the federal Davis-Bacon Act wage provisions.

A copy of the applicable DOL wage determination(s) is included in the Supplementary Conditions.

- _____ wage decision, ____ county, publication date _____
- _____ wage decision, ____ county, publication date _____

All laborers and mechanics employed by contractors or subcontractors on this project shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the U.S. Department of Labor (DOL) in accordance with Subchapter IV of Chapter 31 of Title 40, United States Code.

If the applicable wage determination does not provide a rate for a classification of work to be performed, the Contractor must request additional classifications and wage rates to be added in conformance to the contract wage determination after contract award.

Guidance for USDOL conformance procedures is available using the following link: https://www.dol.gov/whd/govcontracts/pwrb/Tab7.pdf

No allowances or extra considerations on behalf of any contractor or subcontractor will be permitted subsequently by reason of error or oversight on account of Department of Labor wage determinations.

Bidders shall refer to the above-referenced CWSRF Supplementary Conditions for additional information and guidance on Davis Bacon requirements. The Contractor must comply with all Federal requirements found in the CWSRF Supplementary Conditions.

State Prevailing Wages

State prevailing wage rates apply to this project.

A copy of the applicable state Prevailing Wage determination(s) is included in the Supplementary Conditions.

- _____ wage decision, ____ county, publication date _____
- _____ wage decision, ____ county, publication date _____

If the applicable state Prevailing Wage determination does not provide a rate for a classification of work to be performed, the Contractor must request additional classifications and wage rates to be added in conformance to the contract wage determination after contract award.

If there is a difference between the federal Davis-Bacon wage rates and the state Prevailing Wage rates, Contractor shall pay the higher of the two rates.

END OF SECTION

SECTION SC 34

CONTRACTORS GUIDE TO DAVIS-BACON

A Contractor's Guide to Prevailing Wage Requirements for Federally-Assisted Construction Projects - (01/2012)
The guidance document can be found by navigating to the US Department of Housing and Urban Development website or by following the link below:
https://www.hud.gov/sites/documents/4812-LRGUIDE.PDF

END OF SECTION SC 34

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SECTION SC 36

EQUAL OPPORTUNITY CLAUSE

During the performance of this contract, the contractor agrees as follows:

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

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

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or workers' representatives of the contractor's commitment under this section, and shall post copies of the notice in conspicuous places available employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

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

(6) In the event of the contractor's non compliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24,1965, so that such provisions

will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the Department may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Department, the contractor may request the United States to enter into such litigation to protect the interest of the United States.

END OF SECTION

SECTION SC-38

EXECUTIVE ORDER 11246

PART 1 - GENERAL

1.1 DESCRIPTION

A. Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these specifications:
   a. "Covered area" means the geographical area described in the solicitation from which this Contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941.
   d. "Minority" includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North American and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the CONTRACTOR, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this Contract resulted.
3. If the CONTRACTOR is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and

to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contract¬ors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The CONTRACTOR shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this Contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the CONTRACTOR should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The CONTRACTOR is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the CONTRACTOR has a collective bargaining agreement, to refer either minorities or women shall excuse the CONTRACTOR's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the CONTRACTOR during the training period, and the CONTRACTOR must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The CONTRACTOR shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the CONTRACTOR's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The CONTRACTOR shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the CONTRACTOR's employees are assigned to work. The CONTRACTOR, where possible, will assign two or more women to each construction project. The CONTRACTOR shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the CONTRACTOR's obligation to maintain

such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the CONTRACTOR or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the CONTRACTOR by the union or, if referred, not employed by the CONTRACTOR, this shall be documented in the file with the reason therefore, along with whatever additional actions the CONTRACTOR may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the CONTRACTOR has a collective bargaining agreement has not referred to the CONTRACTOR a minority person or woman sent by the CONTRACTOR, or when the CONTRACTOR has other information that the union referral process has impeded the CONTRACTOR's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the CONTRACTOR's employment needs, especially those programs funded or approved by the Department of Labor. The CONTRACTOR shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the CONTRACTOR's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the CONTRACTOR in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and, by posting the company's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of

these meetings, persons attending, subject matter discussed and disposition of the subject matter.

h. Disseminate the CONTRACTOR's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media and providing written notification to and discussing the CONTRACTOR's EEO policy with other Contractors and Subcontractors with whom the CONTRACTOR does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the CONTRACTOR’s recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source the CONTRACTOR shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a CONTRACTOR's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60.3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the CONTRACTOR's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the CONTRACTOR's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the CONTRACTOR is

a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through 7p of these Specifications provided that the CONTRACTOR actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the CONTRACTOR's minority and female workforce participation, makes a good faith effort to meet its individual goals and time-tables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the CONTRACTOR. The obligation to comply, however, is the CONTRACTOR's and failure of such a group to fulfill an obligation shall not be a defense for the CONTRACTOR's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The CONTRACTOR, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the CONTRACTOR may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the CONTRACTOR has achieved its goals for women generally, the CONTRACTOR may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The CONTRACTOR shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The CONTRACTOR shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The CONTRACTOR shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing Subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any CONTRACTOR who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The CONTRACTOR, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the CONTRACTOR fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 80-4.8.
14. The CONTRACTOR shall designate a responsible official to monitor all employment related activity to ensure that the company's EEO policy is being carried out, to submit reports relating to the provision hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction

trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

END OF SECTION

SECTION SC-40

CERTIFICATION OF NONSEGREGATED FACILITIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Certification of Nonsegregated Facilities - (Applicable to federally assisted construction Contracts and related Subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity Clause).

The federally assisted construction CONTRACTOR certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction CONTRACTOR certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction CONTRACTOR agrees that a breach of this certification is a violation of the Equal Opportunity clause in this Contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The federally assisted construction CONTRACTOR agrees that (except where he has obtained identical certifications from proposed Subcontractors for specific time periods) he will obtain identical certifications from proposed Subcontractors prior to the award of Subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such certifications in his files.

_____

Signature Date

_____

Name and Title of Signer (Please Type)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

END OF SECTION

SECTION SC-41

NOTICE TO LABOR UNIONS OR OTHER ORGANIZATIONS OF WORKERS NONDISCRIMINATION IN EMPLOYMENT

To: _____
(Name of union or organization of workers)

The undersigned currently holds Contract(s) with _____
(Name of Applicant)

involving funds or credit of the U. S. Government of (a) subcontract(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Executive Order 11246, dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, creed, or national origin. This obligation not to discriminate in employment includes, but is not limited to, the following:

HIRING, PLACEMENT, UPGRADING, TRANSFER, OR DEMOTION;

RECRUITMENT, ADVERTISING, OR SOLICITATION FOR EMPLOYMENT;

TRAINING DURING EMPLOYMENT; RATES OF PAY OR OTHER FORMS

OF COMPENSATION; SELECTION FOR TRAINING, INCLUDING

APPRENTICESHIP; LAYOFF, OR TERMINATION.

This notice is furnished you pursuant to the provisions of the above contract (s) or subcontract(s) and Executive Order 11246.

COPIES OF THIS NOTICE WILL BE POSTED BY THE UNDERSIGNED IN CONSPICUOUS PLACES AVAILABLE TO EMPLOYEES OR APPLICANTS FOR EMPLOYMENT.

_____

/s/ _____
(Contractor or Subcontractor)

_____
(Date)

END OF SECTION

SECTION 00920

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:
Engineer:
Contractor:
Project:
Contract Name:

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

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

[Describe the portion of the work for which Certificate of Substantial Completion is issued]

Date of Substantial Completion: [Enter date, as determined by Engineer]

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

[List amendments to Owner's Responsibilities]

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

[List amendments to Contractor's Responsibilities]

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

[List attachments such as punch list; other documents]

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

Engineer

By *(signature)*: _____
Name *(printed)*: _____
Title: _____

END OF SECTION

SECTION 00935

NOTICE OF ACCEPTABILITY OF WORK

Owner: Owner's Project No.:
Engineer: Engineer's Project No.:
Contractor: Contractor's Project No.:
Project:
Contract Name:
Notice Date: Effective Date of the Construction Contract:

The Engineer hereby gives notice to the Owner and Contractor that Engineer recommends final payment to Contractor, and that the Work furnished and performed by Contractor under the Construction Contract is acceptable, expressly subject to the provisions of the Construction Contract's Contract Documents ("Contract Documents") and of the Agreement between Owner and Engineer for Professional Services dated [date of professional services agreement] ("Owner-Engineer Agreement"). This Notice of Acceptability of Work (Notice) is made expressly subject to the following terms and conditions to which all who receive and rely on said Notice agree:

1. This Notice has been prepared with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.
2. This Notice reflects and is an expression of the Engineer's professional opinion.
3. This Notice has been prepared to the best of Engineer's knowledge, information, and belief as of the Notice Date.
4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's Work) under the Owner-Engineer Agreement, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Owner-Engineer Agreement.
5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Contract Documents, or to otherwise comply with the Contract Documents or the terms of any special guarantees specified therein.
6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

Engineer

By *(signature)*: _____
Name *(printed)*: _____
Title: _____

END OF SECTION

SECTION 00936

CONSENT OF SURETY TO FINAL PAYMENT

To: _____ (Owner)
_____
_____

From: _____ (Contractor)
_____
_____

CONTRACT TITLE: _____
BOND NUMBER: _____

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the _____ (Surety Company) on the bond of the Contractor hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to the Owner as set forth in the said Surety Company's Bond.

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this _____ day of _____, 20___.

_____
Surety Company Name

_____
Signature of Authorized Representative

_____
Printed Name and Title

Attest: (Seal)

Note: Power of Attorney should be attached in instances where same applies.

END OF SECTION

SECTION 00937

CONTRACTOR'S AFFIDAVIT

STATE OF _____

COUNTY OF _____

Before me, the undersigned, a _____
(Notary Public, Justice of Peace, Alderman)

in and for said County and State personally appeared, _____
(Individual, Partner or duly

_____ who being duly sworn according to law
(Authorized Representative of Corporate Contractor)

deposes and says that the cost of all the Work, and outstanding claims and indebtedness of whatever nature arising out of the performance of the contract between

_____
(Owner)

and _____ of _____
(Contractor)

dated _____ for the construction of the _____
(Agreement Date) (Project)

_____ and necessary appurtenant installations have been paid in full.

_____
(Individual, Partner, or duly authorized representative of corporate contractor)

Sworn to and subscribed before me
This _____ day of _____, 20___

END OF SECTION

SECTION 00938

CONTRACTOR'S RELEASE

KNOW ALL PERSONS BY THESE PRESENTS that _____ (Contractor)
of _____, County of _____ and State of _____

do hereby acknowledge that _____ (Contractor) has this day had, and received of and from _____ (Owner) the sum of One Dollar and other valuable considerations in full and complete satisfaction and payment of all sums of money owed, payable and belonging to _____ (Contractor) by any means whatsoever, for on account of a Contract Agreement between _____ (Owner) and _____ (Contractor) dated _____ (Agreement Date) for _____ (Project)

NOW, THEREFORE, the said _____ (Contractor)

(for myself, my heirs, executors and administrators) (for itself, its successors and assigns) do/does, by these presents remise, release, quit-claim and forever discharge _____ (Owner), of and from all claims and demands, arising from or in connection with the said contract dated _____ (Agreement Date), and of and from all, and all manner of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specialties, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law or equity, or otherwise, against _____ (Owner) its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can, shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of recorded time to the date of these presents.

IN WITNESS WHEREOF, _____
(Contractor)

has caused these presents to be duly executed this _____ day of _____ 20_____

Signed, Sealed and Delivered in the presence of:

_____ _____(seal)
(Individual -Contractor)

_____(seal)
(Partnership - Contractor)

_____ By _____(seal)
(Partner)

Attested:

_____
(Corporation)

_____ By _____
(Secretary) (President or Vice President)

(Corp. Seal)

END OF SECTION

SECTION 00939

WAIVER OF LIEN - MATERIALS AND LABOR

STATE OF _____
COUNTY OF _____

To: _____ (Owner)
_____
_____

WHEREAS, _____ (the undersigned) have been employed by _____ (Contractor) on the _____ (Project Name) to furnish the following:
_____
_____
_____ (description of material and services).

NOW THEREFORE, the undersigned, for good and valuable considerations do hereby waive and release any and all lien, or right of lien, or claim to lien on said above project and premises under the Law, in relation to Mechanics' Liens Law, on account of labor and materials, or both, furnished by the undersigned to or on account of the said contract for the said project and premises only so far as that portion of work which has been included in our requisition dated _____ and all prior requisitions.

THIS WAIVER AND RELEASE is being made to the undersigned in the amount of $ _____ which sum the undersigned certifies to be the balance due the undersigned for all labor, materials or both, furnished by the undersigned to or on account of the said contract as included on Contractor's requisition dated _____.

GIVEN UNDER our hand and seal, this _____ day of _____, 20 __.

By: _____
Manufacturer, Supplier or Subcontractor Name

_____
Signature of Authorized Representative

_____
Printed Name and Title

END OF SECTION

SECTION 00940

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

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

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

Description:

[Description of the change to the Work]

Attachments:

[List documents related to the change to the Work]

Purpose for the Work Change Directive:

[Describe the purpose for the change to the Work]

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to: [Check one or both of the following]

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

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

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

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

Basis of estimated change in Contract Price:

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

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

SECTION 00941

CHANGE ORDER NO.: [Number of Change Order]

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

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

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	Change in Contract Times [as days or dates]
Original Contract Price: $	Original Contract Times: Substantial Completion: Ready for final payment:
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. [Number of previous CO]: $	[Increase] [Decrease] from previously approved Change Orders No.1 to No. [Number of previous CO]: Substantial Completion: Ready for final payment:
Contract Price prior to this Change Order: $	Contract Times prior to this Change Order: Substantial Completion: Ready for final payment:
[Increase] [Decrease] this Change Order: $	[Increase] [Decrease] this Change Order: Substantial Completion: Ready for final payment:
Contract Price incorporating this Change Order: $	Contract Times with all approved Change Orders: Substantial Completion: Ready for final payment:

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

END OF SECTION

SECTION 00942

FIELD ORDER NO.: [Number of Field Order]

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

Contractor is hereby directed to promptly perform the Work described in this Field Order, issued in accordance with Paragraph 11.04 of the General Conditions, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference:

Specification Section(s):

Drawing(s) / Details (s):

Description:

[Description of the change to the Work]

Attachments:

[List documents supporting change]

Issued by Engineer

By: _____

Title: _____

Date: _____

END OF SECTION

SECTION 01010B

SUMMARY OF WORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Location: The Work locations include, but are not limited to, locations within the right-of-ways on the following streets and easements in the City of Bath.
   1. Green Street
   2. Lincoln Street
   3. High Street
   4. Oak Street
   5. Cross Country from High Street to Oak Street

B. Work Included: The Work includes, but is not limited to, the following:
   1. New Storm Drain System:
      a. Storm drains, outfalls and culverts
      b. Drain manholes and catch basins
      c. Storm drain and catch basin laterals
      d. Removal and disposal or abandonment of existing drain manholes, catch basins and catch basin laterals
      e. Existing flow management/ bypass pumping for installation of new storm drain pipes, catch basins, and manholes
   2. New Sewer System:
      a. Gravity sanitary sewers
      b. Sewer manholes
      c. Sewer service laterals
      d. Removal and disposal or abandonment of existing sewer or combination manholes, sewers and laterals
      e. Existing flow management/ bypass pumping for installation of new sanitary sewer pipes, manholes and laterals
   3. Testing of sanitary sewers, water mains, valves and manholes for proper installation and performance.
   4. All related site work including trench excavation, ledge excavation, groundwater dewatering, disposal of excess excavated materials, filter fabric, bedding, backfill, compaction, road/drive subbase, paving, loam/seed and landscaping.
   5. Other miscellaneous work shown in the Specifications for a complete and operational system.

C. Related Work Specified Elsewhere
   1. Coordination: Section 01050
   2. Alternates: Section 01100
   3. Construction Schedules: Section 01310
   4. Temporary Facilities and Controls: Section 01500
   5. Temporary Bypass Pumping Systems: Section 01515
   6. Traffic Regulation: Section 01570

7. Site work, piping, structures, testing requirements are specified in Division 2.

D. Removals, Relocations and Rearrangements
   1. Examine the existing site for the work of all trades which will influence the cost of the work under the bid. This work shall include removals, relocations and rearrangements which may interfere with, disturb or complicate the performance of the work under the general bid involving systems, equipment and related service lines, which shall continue to be utilized as part of the finished project. The Contractor is responsible for all coordination in this regard.
   2. Provide in the bid a sufficient amount to include all removals, relocations, rearrangements and reconnections herein specified, necessary or required to provide approved operation and coordination of the combined new and existing systems and equipment.
   3. Provide in the bid a sufficient amount to include all temporary facilities required to maintain flows during the construction period, including bypass pumping, temporary piping, temporary metering, etc. The cost shall include the cost for all labor, tools, equipment and materials necessary.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 MAINTAIN EXISTING WORKS

A. Continuous Operations Criteria:
   1. The Contractor shall conduct operations in such a manner and sequence which shall neither result in a disruption of, nor interfere with, the functional workings of any existing utilities.
   2. The Contractor shall furnish, install and operate any piping, equipment and appurtenances necessary to provide the temporary services/facilities required during construction including, but not limited to, bypass pumping, flow barriers and diversions. Temporary facilities, if required, shall have pumping capacity equal to or greater than the existing maximum capacity of the piping as determined by their size and slope.
   3. The Owner will operate and maintain all existing systems and equipment not modified or impacted by the project. The Contractor shall notify and coordinate with the Owner whenever Contractor's temporary facilities or construction will interface with existing utilities.
   4. The Contractor shall be responsible for the operation and maintenance of all new and temporary facilities until such time as the new facilities are accepted by the Owner.

B. Minimize Interference
   1. The Contractor shall at all times conduct operations so as to interfere as little as possible with existing works. The Contractor shall develop a program, in cooperation with the Engineer and interested officials, which shall provide for the construction and putting into service of the new works in the most orderly

manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted

2. Work of connecting with, cutting into and reconstructing existing pipes or structures shall be planned to interfere with the operation of the existing facilities for the shortest possible time and when the demands on the facilities best permit such interference. It may be necessary to work outside of normal working hours to minimize interference. Before starting work which will interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand.

3.2 CONSTRUCTION SEQUENCE

A. The Contractor shall submit to the Engineer for review and acceptance a complete schedule of the proposed sequence of construction operations prior to commencing any work. This schedule shall include the Contractor's plans for doing the work.

B. The Contractor shall submit to the Engineer a written request to deviate from the above sequence with adequate supporting information to demonstrate to the Engineer that the continuity and degree of treatment will not be adversely affected.

3.3 SCHEDULE LIMITATIONS AND WORK RESTRICTIONS/ REQUIREMENTS

A. Work Hours:
   1. Work hours are defined in the Section 00700 (General Conditions) and Section 00800 (Supplemental Conditions).
   2. All Work shall be prohibited on Saturdays, Sundays, and legal holidays
   3. All Work on weekdays shall be performed between the hours of 7:00 AM and after 5:00 PM, except during emergencies.
   4. Work shall include the running of vehicle and equipment engines, which shall not be started prior to 7:00 AM or continued past 5:00 PM.
   5. The Contractor shall request permission to work outside the work hours specified above at least 72-hours in advance of the proposed work. The Contractor shall not commence work outside of the work hours specified above unless or until granted such permission from the Owner and Engineer.

B. Temporary Facilities Plan:
   1. A project Temporary Facilities Plan shall be submitted prior to the Pre-Construction Meeting. The Temporary Facilities Plan shall identify the approach for maintaining continuous operations for each impacted utility.

C. Maintain Services:
   1. Maintain all existing sewer and storm drain services.

D. Traffic Control Plan:
   1. A project-specific Traffic Control Plan shall be submitted prior to the Pre-Construction Meeting (refer to Section 01570). The Traffic Control Plan shall identify traffic management requirements for each distinct component of the project.
   2. Contractor shall provide one lane for the passage of traffic within any work zone unless approved by the Owner.
   3. Contractor shall maintain access to all residences and businesses at all times.

4. Contractor shall main access for garbage collection and mail services to all residences and businesses at all times. Contractor shall coordinate with these service providers.
5. Contractor shall maintain access for bus routes, schools, day care facilities, etc. at all times. Contractor shall coordinate efforts with local school district to ensure access.

E. Special Coordination Requirements:
1. Portions of the work are on private property. An easement has been obtained for this work. The property owners may have a project representative that will participate in project meetings. Work restrictions and requirements specified herein. Contractor shall comply will all conditions outlined in the easements.
2. Portions of the work are on the property of the Exeter Housing Authority. The Exeter Housing Authority is housing for the elderly. An easement has been obtained for this work (See Appendix E). The Exeter Housing Authority will have a project representative that will participate in project meetings. Work restrictions and requirements specified herein. Contractor shall comply will all conditions outlined in the easements.
3. Portions of the work are in Swasey Parkway. Swasey Parkway is a historic parkway with significant old growth trees, shrubs, irrigation systems and stonewalls. The Swasey Parkway receives significant public use (vehicular and pedestrian) and is managed by the Swasey Parkway Trustees. Work in and through this area will require a high level of attention to detail related to aesthetics and protection of existing conditions. The public use of Parkway shall be impacted to the minimum extent practicable. A "Documentation of Understanding" between the Town Public Works Department and the Swasey Parkway Trustees has been prepared for this work (See Appendix F). The Swasey Parkway Trustees will have a project representative that will participate in project meetings. Work restrictions and requirements specified herein. Contractor shall comply will all conditions outlined in the Documentation of Understanding.
4. All work throughout the project shall be coordinated at weekly construction meetings with the Owner and Engineer. This coordination specifically includes scheduling of material deliveries/removals, concrete placements and cranes.

F. Pavement Maintenance and Winter Shutdown Period:
1. The Contractor shall maintain pipe trenches with compacted gravel until pavement operations can be completed.
2. No excavation in paved roadways shall be allowed after November 15.
3. All streets shall be paved prior to any "winter shutdown period", which is defined as November 15th to April 1st. Any temporary pavement placed prior to winter shutdown shall be removed during the following construction season. The substantial completion time and the contract completion dates (or days) include the noted "winter shutdown period".

G. Tree Cutting/Clearing:
1. Tree cutting and/or clearing is prohibited between June 1 and July 31 to protect the Northern Long-eared Bat.

H. Bath Water District is replacing water utilities in Green Street in Fall/Winter 2022.

The contractor should be aware that BWD is doing this work and coordination may be required.

END OF SECTION

SECTION 01045

CUTTING, CORING AND PATCHING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included - This section establishes general requirements pertaining to cutting, excavating, coring, fitting, and patching of the Work required to:
   1. Make alterations to existing structures.
   2. Make the parts fit properly.
   3. Replace work not conforming to requirements of the Contract Documents.
   4. Contractor is responsible for all cutting, coring, and rough and finish patching. Contractor shall coordinate the work of any and all subcontracting trades performing the work.
   5. Contractor is responsible for reviewing with the Owner and Engineer and receiving permission to proceed prior to cutting and coring and patching.

B. Related Work Specified Elsewhere:
   1. Pipe Sleeves and Seals are specified in Section 15092.

C. Quality Assurance:
   1. Perform all cutting, coring and patching in strict accordance with pertinent requirements of these Specifications, and in the event no such requirements are determined, in conformance with the Engineer's written direction.

D. Submittals:
   1. In accordance with the requirements specified in Section 01340. Provide the following information at least 30 days prior to cutting or coring:
      a. Identification and qualifications of cutting/coring subcontractor(s) including: company name, business address contact information, or if by Contractor, indicated as such.
      b. Key plan and schedule of cuts/cores indicating the: location of the cut/core, size (i.e., wall, floor, roof, etc.), equipment to be used and identification of any potential obstructions or embedded conduits and wiring.
   2. Request for the Engineer's consent to proceed:
      a. Prior to cutting which affects structural safety, submit written request to the Engineer for permission to proceed with cutting.
      b. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, Contractor shall notify the Engineer and secure written permission prior to proceeding.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials for replacement of work shall be equal to those of adjacent construction and shall comply with the pertinent sections of these Specifications.

B. Concrete and grout for rough patching shall be as specified in Divisions 3 and 4.

PART 3 - EXECUTION

3.1 CONDITIONS

A. Inspection:
   1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, coring, backfilling, and patching.
   2. After uncovering the work, inspect conditions affecting installation of new work.

B. Discrepancies:
   1. If uncovered conditions are not as anticipated, immediately notify the Engineer and secure needed directions.
   2. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION PRIOR TO CUTTING AND CORING

A. Provide all required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work.

B. All cutting and coring shall be performed in such a manner as to limit the extent of patching.

C. All holes cut through concrete and masonry walls or slabs shall be core drilled unless otherwise approved. No structural members shall be cut without approval of the Engineer and all such cutting shall be done in a manner directed by Engineer. No holes may be drilled in beams or other structural members without obtaining prior approval. All work shall be performed by mechanics skilled in this type of work.

3.3 CORING

A. Coring shall be performed with an approved non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeves, equipment or mechanical seals to be installed.

B. All equipment shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.

C. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

D. Slurry or tailings resulting from coring operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.

E. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from coring operation.

3.4 CUTTING

A. Cutting shall be performed with a concrete wall saw and diamond saw blades of proper size.

B. Provide for control of slurry generated by sawing operation on both sides of wall.

C. When cutting a reinforced concrete wall, the cutting shall be done so as not to damage bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.
D. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.
E. Provide equipment of adequate size to remove cut panel.
F. Slurry or tailings resulting from cutting operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.
G. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from cutting operation.

3.5 PERFORMANCE

A. Perform all required excavating and backfilling as required under pertinent sections of these specifications. Perform cutting, coring and demolition by methods which will prevent damage to other portions of the work and will provide proper surfaces to receive installation of repair and/or new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.
B. Coring or cutting which exposes cut surfaces of reinforcing steel or structural steel shall be coated. Coating shall be 10 mil (dry film thickness) applied in two 5 mil (dry film thickness) coats of a single component moisture cured coal tar urethane or two part coal tar epoxy corrosion barrier. Alternately the exposed steel can be cut back two inches from the surface and a non-shrink grout applied over the steel flush to the concrete core or cut surface.
C. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown.
D. Finish patching shall match existing surfaces as approved.

END OF SECTION

SECTION 01050

COORDINATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Contractor is required to work in close proximity to Owner's existing facilities. The Contractor, under this Contract, will be responsible for coordinating construction activities with Owner to ensure that services, facilities, and safe working conditions are maintained.

B. Other Construction Contractors will be interfacing with this Contract and working within the work area and in the vicinity of this Contract. The Contractor, under this contract, shall act as Construction Coordinator and shall coordinate construction activities with other Contractors working for Owner.

C. The Bath Water District will be replacing the water main in Green Street between mid-August 2022 and early October 2022 and the Contractor will coordinate their work so as not to interfere with the Bath Water District contractor’s work.

D. Any damage to existing structures, equipment and property, accepted equipment or structures, and property or work in progress by others; as a result of the Contractor's or their subcontractor's operations shall be made good by the Contractor at no additional cost to the Owner.

1.2 COORDINATION WITH OTHERS

A. City of Bath:

1. Contractor shall coordinate access, egress, detours and traffic control, if required, at each site with the Bath Police Department. The Contractor shall notify Bath Police, Fire Department and Rescue Squad at least 24 hours in advance of any street closings or detours.
2. Contractor shall coordinate all work on City property with the treatment plant personnel.
3. The Contractor shall be responsible for coordinating and maintaining public services to all public and private properties.

B. Bath Water District (BWD)

1. Contractor shall be responsible for coordinating all work in the vicinity of water lines with the BWD. Contractor shall bear all costs for the BWD's inspection requirements, temporary facilities, water main adjustments and other requirements.

C. Central Maine Power Company (CMP):

1. The Contractor shall be responsible for coordinating all work around CMP facilities with CMP and shall bear all costs of inspection requirements, temporary facilities relocation and other requirements.

D. Consolidated Communications:

1. The Contractor shall be responsible for coordinating and providing telephone service to all construction sites, both temporary and permanent. The Contractor shall also be responsible for coordinating all work around

Consolidated Communications facilities with Consolidated Communications and shall bear all costs of inspection requirements, temporary facilities relocation and all other requirements.

E. The Contractor shall provide the Resident Project Representative and Chief Operator a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the facility one week notice before the start of any work. The Contractor shall provide the facility personnel enough time to obtain materials and perform the work required of them. The Contractor shall daily communicate with the Resident Project Representative and Chief Operator concerning updating the schedule, job progress, delay or early starts that affect the treatment process, facility staffing, etc.

F. Weekly coordination meetings shall be held between the Contractor, Owner's Chief Operator/Superintendent and the Resident Project Representative. This meeting shall cover the following:
   1. Work to be completed the following week
   2. Project Schedule
   3. Shop Drawing and O&M issues
   4. Outstanding RFIs and Clarifications
   5. Change Orders and Field Orders
   6. Review of Record Drawing Information
   7. Discussion/Resolution of any old issues
   8. New issues discussion
   9. Contractor's Safety and Health Plan Updates

G. The Contractor shall be responsible for explicitly notifying all equipment suppliers, electrical subcontractor, and the instrumentation supplier that they are required to coordinate their work with the instrumentation supplier by providing operating sequences, input/out specifications with wiring diagrams for all equipment, and that they shall review and comment on each other's shop drawings to ensure that all interfaces are compatible.

H. Snow Removal Coordination: The Contractor shall be responsible for all snow removal activities in construction and laydown areas onsite. Owner's operations staff will be responsible for snow removal on the main access road around the facility. Contractor is to coordinate closely with Owner's operations staff to maintain access to all areas of the facility to facilitate normal operations.

1.3 CONTRACTOR'S USE OF PREMISES

A. Contractor shall have use of the premises within the limits shown on the Drawings and as defined in the General Conditions for the performance of the Work.

B. Contractor work hours will be limited to 7:00AM to 7:00PM, Monday through Friday. Any work outside these hours will require permission of the Owner and adequate notice. Work shall include the running of vehicles and equipment engines, which shall not be started prior to 7:00 AM or continued past 5:00 PM.

C. Contractor shall coordinate delivery schedules, site access, and other construction-related activities with any other contractors that may be hired by the Owner during the course of construction.

D. Contractor shall assume full responsibility for security of all of their, and their subcontractors, materials and equipment stored on the site.

E. If directed by the Owner, Contractor shall move any stored items which interfere with operations of Owner.
F. Obtain and pay for use of additional storage or work areas if needed to perform the Work.
G. Contractor shall not have access to Owners facilities at any time and shall provide all necessary facilities in accordance with Specification Section 01500.

END OF SECTION

SECTION 01070

ABBREVIATIONS & SYMBOLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Where any of the following abbreviations are used in these Specifications, they shall have the meaning set forth opposite each.

AASHTO	American Association of State Highway & Transportation Officials
AC	Alternating Current
ACI	American Concrete Institute
ACP	Asbestos Cement Pipe
AGA	American Gas Association
AIC	Ampere Interrupting Capacity
AGMA	American Gear Manufacturers Association
AIEE(IEEE)	American Institute of Electrical Engineers (Institute of Electrical and Electronics Engineers, Inc.)
AISC	American Institute of Steel Construction
AMP	Ampere 125-16
Amer. Std.	American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class l25 (ASA Bl6 ll960)
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWWA	American Water Works Association
CCTV	Closed Circuit Television
CF	Cubic Foot
CFM	Cubic Foot Per Minute
CFS	Cubic Foot Per Second
CI	Cast Iron
CIPP	Cured-in-Place Pipe
CIPRA	Cast Iron Pipe Research Association
CSI	Construction Specifications Institute
CY	Cubic Yard
DC	Direct Current
DEP	Department of Environmental Protection
DI (DIP)	Ductile Iron (Pipe)
DOT	Department of Transportation
EDR	Equivalent Directional Radiation

EPA	U.S. Environmental Protection Agency
FPS	Feet Per Second
FT	Feet
GAL	Gallons
GPD	Gallons Per Day
GPM	Gallons Per Minute
HP	Horsepower
IBR	Institute of Boiler and Radiator Manufacturers
IN	Inches
ISA	Instrument Society of America
KVA	Kilovolt-ampere
KW	Kilowatt
LB	Pound
MACP	Manhole Assessment and Certification Program
MAX	Maximum
MGD	Million Gallons Per Day
MIN	Minimum
NACE	National Association of Corrosion Engineers
NASSCO	National Association of Sewer Service Companies
NBS	National Bureau of Standards
NEC	National Electrical Code, Latest Edition
NEMA	National Electrical Manufacturers Association
NEWWA	New England Water Works Association
NPT	National Pipe Thread
OS&Y	Outside Screw and Yoke
PCA	Portland Cement Association
PPM	Parts Per Million
PSI	Pounds Per Square Inch
PSIG	Pounds Per Square Inch Gage
PVC	Polyvinyl Chloride
RPM	Revolutions Per Minute
RUS	Rural Utility Service
SF	Square Foot
STL. W.G.	U.S. Steel Wire, Washburn and Moen, American Steel and Wire Cos., or Roebling Gage
SY	Square yard
TDH	Total Dynamic Head
USAS	Standards of the United States of America Standards Institute (formerly American Standards Association)
USS GAGE	United States Standard Gage
VC	Vitrified Clay
WSP	Working Steam Pressure
Fed. Spec.	Federal Specifications issued by the Federal Supply Service of the General Service Administration, Washington, D.C.

END OF SECTION

SECTION 01150B

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. For lump sum items, payment shall be made to the contractor in accordance with an accepted progress schedule and schedule of values on the basis of actual work completed.

B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amount of materials in place, as shown by final measurements.

1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
2. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Resident Project Representative and determine the quantities of unit price work accomplished and/or completed during the workday.
3. The Resident Project Representative will then prepare two "Daily Progress Reports" which shall be signed by both the Resident Project Representative and Contractor's Representative.
4. Once each month the Resident Project Representative will prepare two "Monthly Progress Summation" forms from the month's accumulation of "Daily Progress Reports" which shall also be signed by both the Resident Project Representative and Contractor's Representative.
5. These completed forms will provide the basis of the Engineer's monthly quantity estimate upon which payment will be made. Items not appearing on both the Daily Progress Reports and Monthly Progress Summation will not be included for payment. Items appearing on forms not properly signed by the Contractor will not be included for payment.
6. After the work is completed and before final payment is made, the Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 SCOPE OF PAYMENT

A. Payments to the Contractor will be made for the actual quantities of the Contract items performed and accepted in accordance with the Contract Documents. Upon completion of construction, if these actual quantities show either an increase or decrease from the quantities given in the Proposal Form, the Contract Unit Prices will still prevail.

B. The Contractor shall accept in compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered

during the prosecution of the Work and until its final acceptance by the Engineer, and for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the Work as herein authorized.

C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

A. When alterations in the quantities of work not requiring supplemental agreements, as hereinbefore provided for, are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.4 OMITTED ITEMS

A. Should any items contained in the bid form be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.5 PARTIAL PAYMENTS

A. Partial payments shall be made monthly as the work progresses. Partial payments shall be made subject to the provisions of the Supplemental and General Conditions.

1.6 PAYMENT FOR MATERIAL DELIVERED

A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used and have been delivered to the construction site, or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the General and Supplemental Conditions.

B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of the Contract.

1.7 FINAL PAYMENT

A. After final measurements are made by the Engineer, the Contractor will prepare a final quantity invoice of the amount of the Work performed and the value of such Work. Owner shall make final payments of the sum found due less retainages subject to provisions of the General and Supplemental Conditions.

1.8 INCIDENTAL WORK

A. Incidental work items for which separate payment will not be made includes, but is not limited to, the following items:
   1. Pre-Construction photographs or videos.

2. Project Record Documents
3. Signs
4. Clean-up and restoration of property.
5. Restoration of fences and other structures.
6. Cooperation and coordination with other Contractors and utility companies including related inspection costs and other costs (Refer to Section 01050).
7. Utility crossings and relocations, unless otherwise paid for.
8. Temporary utility services to buildings, as required to maintain service during construction.
9. Minor Items – such as relocation of sign posts, guard rails, rock wall, mail boxes, curbs, traffic loop detectors, pavement markings, etc., damaged as a result of construction activities.
10. Trench boxes, steel and/or wood sheeting as required, including that left in place.
11. Maintenance of all existing sewer flows and repair of existing sewer pipes.
12. Temporary Construction Dewatering as necessary.
13. Dust control.
14. Quality assurance testing.
15. Final cleaning of sewers, force mains and storm drains.
16. Clearing, grubbing and stripping.
17. Loam, seeding, grading, liming, fertilization, mulching, and watering.
18. Routine flagman services.
19. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications and other submittals required by the Contract Documents.
20. Repair and replacement of water lines under 2-inches in size, culverts, underdrains, rock lined drainage trenches in streets and other utilities damaged by construction activities and corresponding proper disposal of removed materials unless otherwise paid for.
21. Temporary construction necessary for construction sequencing and other facilities not permanently incorporated into the work.
22. Weather protection.
23. Permits not otherwise paid for or provided by the Owner.
24. Visits to the project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required.
25. All excavation except the test pits specifically shown or ordered by the Engineer to establish sewer line and water line locations, earth excavation below grade and rock excavation.
26. Contract administration and insurance.
27. Test pits to establish in place field soils density, groundwater conditions, or requirements for dewatering.
28. Pipe markings.
29. Replacement of unsuitable material above pipe bedding and backfill.
30. Earthwork (Except Ledge)
31. Test Pits for the Contractor’s Benefit
32. Sewer service risers.

33. Temporary resetting or replacement of existing street and traffic signs and temporary traffic signals where necessary.
34. Disconnecting and reconnecting traffic signal power to accommodate the work.
35. Raising and lowering of existing frames and covers of buried utilities to grade unless payment is otherwise provided for.
36. Horizontal adjustment of existing frames, covers and grates to match final grades and curb faces.
37. Removing and replacing existing SMH inverts to accommodate new and replacement pipes.
38. Removing and resetting of existing steps, guard rails, fences, walls and non-paved brick or paver walkways disturbed during construction, other than those identified on the Drawings to be replaced.
39. Protection of existing block and stone retaining walls unless otherwise identified to be removed, relocated or modified in the Drawings.
40. Cross-over channels and underdrains for sewer, storm drain and water excavation pits, and check dams for all excavated channels.
41. Installing temporary pavement markings on binder course that will not be surfaced within 14 days of installation.
42. Installing raised pavement markers and temporary symbols on the binder course within 48 hours of installing any section of the binder course and maintaining these throughout the project duration.
43. Locating and verifying the locations of water and sewer services within the limits of work. Capping or plugging existing underground utilities as shown on the plans and Dye testing as required to determine bulkheading and reconnection requirements.
44. Modifying, to include coring, patching and parging of existing sewer and drainage structures to accommodate new pipes as shown on plans.
45. Removal and subsequent delivery of replaced or obsolete frames, covers, grates, hydrants curbstones and signs to a location within the City limits designated by the Owner.
46. Leak testing of all existing sewer manholes whose frames and covers have been replaced.
47. Removal of temporary or permanent pavement markings, prior to paving. This includes removing markings that are applied on the winter binder layer, prior to installation of the wearing course.
48. Clay (impervious material) trench dams. Concrete Trench Dams are a unit price item.
49. Relocation, replacement and extension of all underground telephone, power, cable, data, gas and all other private utility services from within the Rights of Way to the dwellings, structures or meters.
50. Flushing and final cleaning of storm drain system.
51. Completion of the Storm Water Pollution Prevention Plan as well as required inspections, monitoring and reporting.
52. Post Completion CCTV and report of Entire Sanitary Sewer System installed under this Contract.

53. Provide temporary pavement marking paint on the streets as shown in the layout plans on the binder course within two weeks of pavement installation if the wearing course will not be installed until after a winter season.

1.9 DESCRIPTION OF PAY ITEMS

A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
B. Each unit or lump-sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

(1) – Mobilization/Demobilization

A. Method of Measurement: Lump sum. Total of bid item shall not exceed 5% of Total Amount of the Bid.
B. Basis of Payment: Mobilization/demobilization costs are those costs of initiating and ending the contract. Payment for mobilization/demobilization shall be a lump sum at the price as stated in the Bid Form. Seventy-Five percent (75%) of the lump sum will be payable when the Contractor is operational on the site and the remaining 25% of the lump sum will be payable when the Contractor leaves the site following the completion of all contract work. For purposes of payment on this item, "Operational" shall mean the Contractor has provided all required and properly executed bonds and insurance certificates and the owner has approved the following: Construction Schedule, Erosion Control Plan, and Traffic Control Plan. "Operational" shall also mean Contractor has performed the pre-construction television sewer inspection including CCTV video of the sewer to be abandoned that runs from Green Street to Oak Street, delivered the records of it to the Engineer and the Engineer has acknowledged the records are accurate and of use. Only one lump sum payment divided into the two partial payments described herein shall be made to cover all mobilization/demobilization costs throughout the entire contract.

(2) – Traffic Control

A. Method of Measurement: Traffic regulation and control will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
B. Basis of Payment: Payment for traffic regulation and control shall constitute full compensation for all traffic regulation and control efforts and including all labor, materials, equipment, signage and supervision required to provide comprehensive and professional traffic regulation and control at all project locations, excluding uniformed police officer allowance. The traffic control plan, temporary pavement markings for traffic re-routing and pedestrian safety are included in this item. Payment under this item will be made for full-time dedicated flaggers only. Part-time flaggers will not be considered adequate. The lump sum shall be paid in partial payments over the course of the project, where the percentage paid is equal to the percentage of completion of the entire Contract.

(3) – Erosion and Sedimentation Control

A. Method of Measurement: Erosion and Sedimentation controls shall be paid for on a lump sum basis. This item shall include all erosion and sedimentation controls

required for the Base bid.

B. Basis of Payment: The lump sum payment shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including installation and maintenance of erosion and sedimentation control measures, catch basin inserts, preparing the site for construction, handling storm water flows during construction, proper disposal of dewatering discharge, and all else incidental thereto and in accordance with all applicable permit requirements, for which payment is not provided under other items. This item includes erosion and sediment control installation as directed by Engineer, as well as re-installation or repair of erosion control prior to or following a storm event. This item includes erosion control blanketing and matting for slopes in exceedance of 3:1 horizontal to vertical, and erosion control blanketing for ditch protection. Filter fabric to be installed adjacent to existing retaining walls shall be included with this item. The lump sum shall be paid in partial payments over the course of the project, where the percentage paid is equal to the percentage of completion of the entire Contract.

(4) – Remove Trees and Stumps, Backfill, Loam and Seed

A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of trees/stumps completely removed with the resulting void completely restored.

B. Basis of Payment: Removal of trees with stumps, backfill loam and seed shall be paid for at the unit price per each as stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; for complete removal of the tree and stump, backfilling the void with suitable material compacted in 8-inch lifts, grading of unpaved areas disturbed during construction, providing 6-inch of loam and seeding the top of the restored area for new grass growth, and for all other work and expenses incidental thereto for which payment is not provided under other items.

(5) – Excavate and Dispose of Pavement and Earth Excavation

A. Method of Measurement: Excavate and disposal of pavement and earth excavation accepted for payment shall be the actual cubic yards of material removed to achieve the design subgrade elevations of the utilities, road, and sidewalks as shown on the plans.

B. Basis of Payment: The contract unit price per cubic yard for excavation and disposal of pavement and earth excavation shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including sawcutting of existing pavement, excavation to subgrade elevations for sidewalks, driveways, and roadways. The price includes disposal of excess and unsuitable materials and the fine grading and compaction of the subgrade surface and all else incidental thereto for which payment is not provided under other items. Excavation for installation of utilities, underdrains, and structures is not included in this line item is included for payment elsewhere.

(6) – Remove and Dispose of Concrete

A. Method of Measurement: Removal and disposal of concrete accepted for payment

shall be the actual cubic yards of concrete removed and disposed within the limits as shown on the plans.

B. Basis of Payment: The contract unit price per cubic yard of excavation and disposal of concrete shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including jackhammering of concrete and all else incidental thereto for which payment is not provided under other items.

(7) – 8-inch PVC Sewer Pipe

A. Method of Measurement: Sewer pipe measured for payment shall be the number of linear feet installed measured along the center line of the pipe as laid including fittings. Pipes shall be measured between centers of the manholes minus half the inside diameter of each manhole. Pipe installed into the manhole will not be measured for payment.

B. Basis of Payment:

1. The contract unit price per linear foot for sewer pipe shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation), dewatering, bedding, furnishing and installing pipe and fittings, making connections to new and existing manholes, installation of impervious material dams, backfill including aggregate base and subbase material, compaction, testing; light cleaning prior to each CCTV inspection; post-CCTV inspection of the sewer, providing video files, database, and written logs on external hard drives; maintaining existing flows during construction of new facilities, and all else incidental thereto for which payment is not provided under other items.
2. Payment for this work on interim requisitions shall be according to the following percentages:
    a. Sewer pipe acceptably set in place and backfilled - 90 percent.
    b. Sewer pipe successfully tested - 10 percent.

(8) – 4” Sanitary Service Connections

A. Method of Measurement: This item shall consist of installing house sanitary service leads from sanitary sewer mains to the edge of right-of-way as shown on the Drawings and/or as determined in the field. Measurement shall be from the top of the tee or wye in the main to the edge of right-of-way measured along the centerline of the pipe.

B. Basis of Payment:

1. The contract unit price per linear foot shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation), dewatering, bedding, furnishing and installing pipe and fittings, adequately capping service connection and marking location as specified and shown on the Drawings or connection to existing service, backfilling including aggregate base and subbase material , compaction, cleaning, testing, maintaining existing flows during construction of new facilities and all else incidental thereto for which payment is not provided under other items..

2. Payment for this work on interim requisitions shall be according to the following percentages:
   a. Service pipe acceptably set in place and backfilled - 90 percent.
   b. Service pipe successfully cleaned and tested - 10 percent.

(9) – 4-foot Diameter Sanitary Sewer Manholes

A. Method of Measurement: Sanitary manholes accepted for payment shall be the actual vertical feet of structures installed and accepted complete in place, from the lowest invert to finish grade.

B. Basis of Payment:
   1. The contract unit price per vertical foot shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation), bedding, furnishing and installing precast concrete sections, frames, covers, frost protective wrap , masonry materials, waterproofing, constructing inverts, backfilling including aggregate base and subbase material, compaction, cleaning, testing, maintaining existing flows during construction, and all else incidental thereto for which payment is not provided under other items.
   2. Payment for this item shall be as follows:
      a. Manhole acceptably set in place and backfilled - 90 percent.
      b. Manhole successfully cleaned and tested - 10 percent.

(10) – Core Existing Manhole

A. Method of Measurement: Coring existing manholes and connecting utilities measured for payment shall be the actual number of structures modified and connected to, and accepted complete in place, as indicated on the plans and as may be added by the Engineer.

B. Basis of Payment:
   1. The contract unit price for coring existing manholes and connecting utilities shall be full compensation for all labor, materials, tools, and equipment necessary to complete this work including excavation (except rock excavation), rotating existing concrete top to curbline, coring existing structure, sealing, backfill, compaction, water tight sealing, cleaning, testing, and all else incidental thereto for which payment is not provided under other items.
   2. Payment for this item shall be as follows:
      a. 90 percent of the unit price upon coring of existing manhole and connecting utility.
      b. 10 percent of the unit price upon successful completion of cleaning and final existing manhole soil tight seal testing.

(11) – Pipe Trench Insulation

A. Method of Measurement: Pipe trench insulation accepted for payment shall be the actual linear feet of trench insulation installed and accepted complete in place.

B. Basis of Payment: The contract unit price per linear foot for pipe trench insulation shall be full compensation for all labor, materials, tools and equipment necessary to

complete this work including excavation, bedding, insulation, backfill, compaction and all else incidental thereto for which payment is not provided under other items.

(12) – 12-inch Storm Drain Pipe

A. Method of Measurement: Storm drain pipe measured for payment under these items shall be the number of linear feet installed measured along the center line of the pipe as laid, regardless of materials of construction. Pipes shall be measured between centers of manholes or structures minus half the inside diameter of each structure. Pipe installed into the structure will not be measured for payment.

B. Basis of Payment: The contract unit price per linear foot for storm drain pipe installed shall be full compensation for all labor, materials, and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (excluding ledge), dewatering, bedding, furnishing and installing pipe and fittings, backfill including aggregate base and subbase material, compaction, cleaning pipes and sumps, connection to existing piping and structures as required, and all else incidental thereto for which payment is not provided under other items.

(13) – 4-foot Diameter Catch Basins

A. Method of Measurement: Quantity of catch basins to be paid for under these items shall be the actual vertical feet of structures installed and accepted complete in place, measured vertically from the bottom of the sump to finish grade.

B. Basis of Payment: Catch basins shall be paid for at the unit price per vertical foot as stated in the Bid Schedule. Said unit price shall be full compensation for all labor, materials and equipment necessary to complete the installation including sawcut, management, removal and disposal of pavement; excavation (excluding ledge), dewatering, bedding, furnishing and installing precast sections, furnishing and installing frames and grates at proper grade, backfilling including aggregate base and subbase material, compaction, cleaning sumps and all else incidental thereto for which payment is not provided under other items.

(14) – 4-foot Diameter Drain Manholes

A. Method of Measurement: Drain manholes accepted for payment shall be the actual vertical feet of structures installed and accepted complete in place, from the lowest invert to finish grade.

B. Basis of Payment:

1. The contract unit price per vertical foot shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including sawcut, management, removal and disposal of pavement; excavation (except ledge excavation), bedding, furnishing and installing precast concrete sections, frames, covers, frost protective wrap, masonry materials, waterproofing, constructing inverts, backfilling including aggregate base and subbase material, compaction, cleaning, testing, maintaining existing flows during construction, and all else incidental thereto for which payment is not provided under other items.
2. Payment for this item shall be as follows:

a. Manhole acceptably set in place and backfilled - 90 percent.
b. Manhole successfully cleaned and tested - 10 percent.

(15) – Protect Existing Trees

A. Method of Measurement: Protect Existing trees shall be measured by the actual number of trees protected by the contractor and accepted by the Engineer.

B. Basis of Payment: The unit price for each shall be full compensation for furnishing all labor, materials and equipment required to protect the existing trees as identified in the plans, including but not limited to root feeding, arborist fees, extraordinary protective measures, use of light weight and low ground pressure equipment, manual labor in lieu of equipment and all other work, measures, and expenses for which payment is not provided under other items.

(16) – Test Pit Excavation and Backfill

A. Method of Measurement: The quantity to be paid for under this item shall be the actual number of test pits performed as authorized by the Engineer.

B. Basis of Payment: Test pit excavations shall be paid for at the unit price per each test pit as stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all labor, tools, and equipment; for sawcut and removal of pavement, excavation (except ledge excavation), dewatering, backfill including aggregate base and subbase, compaction, temporary pavement; providing the test pit result information to the Engineer and for all other work and expenses incidental thereto for which payment is not provided under other items.

(17) – Granular Fill

A. Method of Measurement: Placement of granular fill for payment shall be the number of cubic yards of aggregate placed within the limits indicated on the plans, complete and in place.

B. Basis of Payment: The contract unit price per cubic yard for placement of granular fill shall constitute full compensation for all materials, labor and equipment necessary to complete this work including excavation, saw cutting, milling and grinding of existing pavement, transportation of existing bituminous pavement and existing base material to approved stockpiling sites, furnishing and transporting aggregate sub base, base and bluestone gravel to the project site, preparing subgrade, placing, grading, compaction, dust control and all else incidental thereto for which payment is not provided under other items.

(18) – Trench Ledge Excavation and Disposal

A. Method of Measurement:
1. Ledge excavation measured for payment shall be the number of cubic yards of ledge removed during construction. This quantity shall be determined by:
2. Exposing the ledge profile for measurement. Excavation and backfill of the earth overburden shall be considered incidental, and no separate payment shall be made therefore.
3. Should the Contractor elect to pre-drill and blast ledge without exposing the ledge surface for measurement, ledge depths shall be determined by the

Resident Project Representative at the time of drilling or, when direct drilling observation is not conducted, the ledge profile shall be measured after excavation, and 20% of the ledge volume thus measured shall be deducted due to ledge expansion caused by the blasting operation.

4. The payment limit for trench width shall be between vertical planes which are a distance apart equal to the sum of 18 inches plus 1-1/3 times the nominal outside diameter of pipe which is to be installed in the trench (min. of 3 feet) and extending from the top of the ledge surface to a depth of 6 inches below the invert grade of the pipe. Where two pipes are installed in the same trench, trench ledge excavation shall be measured as the actual volume of ledge removed between vertical planes which are a distance apart equal to the sum of 3 feet plus the sum of the pipes nominal outside diameter. Where three pipes are installed in the same trench, trench ledge excavation shall be measured as the actual volume of ledge removed between vertical planes which are a distance apart equal to the sum of 4.5 feet plus the sum of the pipes nominal outside diameter.
5. Ledge excavation for structures (including manholes) shall be measured as 18 inches outside the structure and extending to a depth of 6 inches below the base of the structure indicated on the Drawings.
6. Rocks or boulders greater than two cubic yards volume shall be considered as ledge excavation. Volume of rocks shall be determined from their average length, width, and depth as measured by the Engineer.

B. Basis of Payment:

1. The contract unit price per cubic yard for ledge excavation shall be full compensation for all labor, materials, tools and equipment necessary to complete the excavation including conducting the pre-blast survey, drilling, blasting, excavating, loading and disposing the excess or unusable material outside the work limits, suitable replacement backfill, and all else incidental thereto for which payment is not provided under other items.
2. Not all the potential ledge locations are identified on the Drawings and ledge could be encountered anywhere within the limits of work. Such ledge, if encountered, is not considered a Differing Subsurface or Physical Condition. The unit price in the bid form shall apply to all ledge encountered and removed.

<u>(19) and (20) – Type A and D Aggregate Base</u>

A. Method of Measurement: Placement of aggregate measured for payment shall be the number of cubic yards of aggregate placed for roadways, driveways and sidewalks measured and calculated within the limits indicated on the plans, complete and in place.

B. Basis for Payment:

1. The contract unit price per cubic yard for placement of aggregate sub base, base and hard pack gravel driveways shall constitute full compensation for all materials, labor and equipment necessary to complete this work including excavation, saw cutting, milling and grinding of existing pavement, transportation of existing bituminous pavement and existing base material to approved stockpiling sites, furnishing and transporting aggregate sub base, base and bluestone gravel to the project site, preparing subgrade, placing, grading,

compaction, dust control and all else incidental thereto for which payment is not provided under other items.

2. It includes gravel shoulders and driveways as called for in the plans.

(21) – Reclaim Existing Pavement

A. Method of Measurement: Reclaim existing pavement will be measured by the square yard.

B. Basis of Payment: The accepted quantity of reclaimed existing pavement will be paid for at the contract unit price per square yard, complete in-place which price will be full compensation for furnishing all equipment, materials, and labor for pulverizing, blending, placing, grading, compacting, and for all incidentals necessary to complete the work. The addition of materials to restore profile grade and/or cross-slope in areas shown on the plans or described in construction notes will be paid for separately under designated pay items within the contract. No additional payment will be made for materials salvaged from the project.

(22), (23), (24) and (25) – 19 MM Base Pavement, 12.5 MM Surface Pavement, 12.5 MM Hand Placed Pavement for Trenches, 9.5 MM Hand Placed Pavement

A. Method of Measurement:

1. The quantity of bituminous concrete pavement to be paid for under this item includes:
   a. Initial Pavement - The number of tons of initial pavement placed and removed at the direction of the Engineer, calculated as described below, within the payment limits shown on the Drawings.
   b. Final Pavement - The number of tons of final pavement placed at the direction of the Engineer, calculated as described below, within the payment limits shown on the Drawings.
   c. Trench Pavement - The number of tons of trench pavement placed at the direction of the Engineer, calculated as described below, within the payment limits of trench paving shown on the Drawings.
   d. Driveway/Sidewalk Pavement - The number of tons of driveway/sidewalk pavement hand-placed at the direction of the Engineer, calculated as described below, within the payment limits shown on the Drawings.
2. Actual widths will be used in computing area wherever the width of pavement removed and replaced is less than the limits indicated on the Drawings.
3. The conversion factor to change volume of bituminous concrete pavement measured in place to tons will be 0.055 tons per square yard per inch of thickness.

B. Basis of Payment:

1. Pavement shall be paid for at the Contract unit price per ton stated in the Bid Schedule.
2. Said unit price shall be full compensation for furnishing all materials, labor, equipment and tools necessary for the placement and removal of pavement, preparation of base material, application of tack coat, placement and grading of gravel shoulder material to back up overlay pavement, and installation of

pavement markings. No additional payment will be made to the Contractor for repair work done by them in maintaining bituminous concrete pavement.

(26) – Precast Concrete Curb

A. Method of Measurement: Precast concrete curb measured for payment shall be the actual linear footage of precast concrete curb installed and accepted complete and in place.

B. Basis of Payment: The Contract unit price per linear foot for precast concrete curb shall constitute full compensation for all labor, equipment and materials necessary to complete this work including furnishing and installing curb, subgrade preparation, placement of concrete fill and removal and resetting of existing brick pavers, fences, flagstones and handrails backfill and all labor and appurtenances incidental thereto for which payment is not provided under other items.

(27) – Remove and Reset Existing Granite Curb

A. Method of Measurement: Removal and resetting of existing granite curb measured for payment shall be the actual linear footage of granite curb as measured lengthwise along the front face of each section of curb that are removed and reset.

B. Basis of Payment: The Contract unit price per linear foot for removal and resetting of existing granite curb shall constitute full compensation for all labor, equipment and materials necessary to complete this work including removing and reinstalling walls, subgrade preparation, placement of concrete fill and bedding, backfill and all labor and appurtenances incidental thereto for which payment is not provided under other items.

(28) – Granite Curb Radii

A. Method of Measurement: Granite curb radii measured for payment shall be the actual linear footage of radii pieces installed and accepted complete and in place.

B. Basis of Payment: The Contract unit price per linear foot for granite radii curb stones shall constitute full compensation for all labor, equipment and materials necessary to complete this work including furnishing and installing curb, subgrade preparation, placement of concrete fill and removal and resetting of existing brick pavers, fences, flagstones and handrails backfill and all labor and appurtenances incidental thereto for which payment is not provided under other items.

(29) – Remove, Restore, and Reset Signs

A. Method of Measurement: Remove, Restore, and Reset signs measured for payment shall be the actual number of signs removed, stored, installed, and accepted complete and in place.

B. Basis of Payment: The contract unit price to remove, store, and reset each sign shall constitute full compensation for removing and storing existing signs, furnishing and assembling new sign posts and hardware, labor, and equipment necessary to complete this work including excavating and backfilling holes, and for all incidentals necessary to complete this work.

(30) – Detectable Warning Devices

A. Method of Measurement: Detectable warning devices will be paid for under this item shall consist of the number of square feet of detectible warning device plates installed at the direction of the Engineer.

B. Basis of Payment: The Contract unit price per square foot of detectable warning device shall constitute full compensation for all labor, equipment and materials necessary to complete this work including furnishing and installing rectangular and radial plates, layout, subgrade preparation, anchors, backfill and all labor and appurtenances incidental thereto for which payment is not provided under other items. The concrete component of this installation, as shown in the plan detail, is included in this pay item.

(31) – 1-foot Wide Painted Crosswalk Markings

A. Method of Measurement: 1-foot wide painted crosswalk markings will be measured by the linear foot of crosswalk marking, measured parallel to the surface.

B. Basis of Payment: The accepted quantity of painted crosswalk markings will be paid for at the contract unit price per linear foot complete in place, including furnishing, and adding sand where required.

(32) – Hand Labor Straight Time*

A. Method of Measurement: Hand labor straight time will be measured by the hours of work actually performed, measured to the nearest ¼ hour.

B. Basis of Payment: The accepted quantity of hand labor straight time will be paid for at the contract unit price per hour. The contract unit price shall be full compensation for hiring, transporting, supervising, payment of workmen's compensation, social security taxes, unemployment insurance, overtime, benefits and for all hand tools, protective clothing, and all incidentals necessary to complete the work.

(33) – All Purpose Excavator (Operator Included)*

A. Method of Measurement: All-purpose excavator will be measured by the hour to the nearest ¼-hour. Time spent moving to and from the site within the project limits and from beyond the project limits, servicing, maintaining, and changing attachments will not be measured for payment.

B. Basis of Payment:

1. The accepted quantities of all-purpose excavator will be paid for at the contract unit price per hour. Payment shall include operators, fuel, grease, oil, and other incidentals necessary to operate the excavator.
2. No separate payment will be made to direct work done under these items, except when called for on the Plans. Payment will then be made under Pay Item 36. Payment made will be limited to the grade of foreman and limited to hours spent in actually supervising equipment operators. Such related costs as use of pickup truck, meal and room expenses, benefits, insurance, retirement, travel time, and overtime will not be paid for separately but will be considered incidental to the unit price bid for this pay item.
3. Payment for all purpose excavator will be based on experienced operators, familiar with the work being performed. Operators, determined to be below

normal acceptable standards of production or workmanship, will be paid for at reduced hours as determined by the Resident.

(34) – Truck Large (Operator Included)*

A. Method of Measurement: Truck large (operator included) will be measured by the hour to the nearest ¼-hour. Time spent moving to and from the site within the project limits and from beyond the project limits, servicing, maintaining, and changing attachments will not be measured for payment.
B. Basis of Payment:
    1. The accepted quantities of truck large will be paid for at the contract unit price per hour. Payment shall include operators, fuel, grease, oil, and other incidentals necessary to operate the excavator.
    2. No separate payment will be made to direct work done under these items, except when called for on the Plans. Payment will then be made under Pay Item 36. Payment made will be limited to the grade of foreman and limited to hours spent in actually supervising equipment operators. Such related costs as use of pickup truck, meal and room expenses, benefits, insurance, retirement, travel time, and overtime will not be paid for separately but will be considered incidental to the unit price bid for this pay item.
    3. Payment for all purpose excavator will be based on experienced operators, familiar with the work being performed. Operators, determined to be below normal acceptable standards of production or workmanship, will be paid for at reduced hours as determined by the Resident.

(35) – Foreperson*

A. Method of Measurement: Foreperson will be measured by the hour to the nearest 1/4-hour.
B. Basis of Payment: The accepted quantities of labor will be paid for at the contract unit price per hour. The contract unit price shall be full compensation for hiring, transporting, supervising, payment of workmen's compensation, social security taxes, unemployment insurance, overtime, benefits, and for all protective clothing and all incidentals necessary to complete the work.

(36) – Loaming and Seeding

A. Method of Measurement: The quantity of loaming and seeding and tree removal shall consist of the number of square yards of loaming and seeding installed at the direction of the Engineer within the limits of work shown on the drawings. The diameter of a tree shall be determined by measuring its diameter, 4′-0″ above the ground surface.
B. Basis of Payment:
    1. The square yard unit price shall be full compensation for furnishing all labor, materials, and equipment required to place and grade loam, furnish and place seed, mulch, lime, fertilize and water, assure and maintain grass growth until final acceptance by the Engineer; and for all other work including grading of paved and unpaved areas disturbed during construction and expenses indicated thereto for which payment is not provided under other items. This price shall include clean-up and restoration of property including property boundary

monuments and markers, replacement of shrubs, fences, trees and mulch that are not identified to be removed and which are displaced at the convenience of the Contractor. This price shall include removal of existing pavement, sidewalk, concrete, structures and other manmade features in areas that will be replaced with loam and seed and plantings. This price includes the clearing, grubbing and stripping and stockpiling of topsoil. Areas disturbed for the Contractor's convenience shall be restored at no additional cost to the Owner.

2. 80% at the completion of the installation of the loaming and seeding, upon acceptance by the Engineer. 20% upon final contract completion and consistent coverage and growth of the new turf.

(37) – Remove, Store, and Reset Fence

A. Method of Measurement: Remove, Store, and Reset fence measured for payment shall be the number of linear foot measured within the limits shown on the plans, complete and in place.

B. Basis of Payment: The contract unit price per linear foot of remove, store, and reset fence shall constitute full compensation for furnishing and assembling all materials, labor, and equipment necessary to complete this work including excavating and backfilling holes, and for all incidentals necessary to complete this work.

(38) – Common Borrow Fill

A. Method of Measurement: Placement of fill measured for payment shall be the number of cubic yards of imported fill placed for cover over pipes and side slopes measured and calculated within the limits shown on the plans, complete and in place.

B. Basis of Payment: The contract unit price per cubic yard for placement of common fill shall constitute full compensation for all materials, labor and equipment necessary to complete this work including excavation, furnishing and transporting common fill to the project site, placing, grading, fine grading, compaction, dust control and all else incidental thereto for which payment is not provided under other items.

(39) – Abandon Sewer Pipe (Flowable Fill)

A. Method of Measurement: The quantity of flowable fill to be paid for under this item shall consist of the actual number of cubic yards of flowable concrete, mud slab and anti-flotation collar measured and accepted complete in place as directed by the Engineer within the limits shown on the plans.

B. Basis of Payment: The contract unit price per cubic yard for concrete flowable fill shall be full compensation for all labor, materials, equipment, pumping and supervision necessary to complete this work including cutting and capping of pipe to be filled, pumping of and consolidation of the fill and all else incidental thereto for which payment is not provided under other items.

(40) – Allowance: Asphalt Adjustment

A. Method of Measurement: Allowance to be included and carried in the bid schedule.
B. Basis of payment: The payment for this bid item shall be based on MDOT published data, as outlined in Specification Section 01151 Special Provisions – Price Adjustments.

END OF SECTION

SECTION 01151

SPECIAL PROVISIONS – PRICE ADJUSTMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work under this Contract includes price adjustments for hot mix asphalt (also known as liquid asphalt).

B. Base Prices for hot mix asphalt under this Project are defined as the Price presented on the Maine Department of Transportation (MDOT) website. MDOT posts liquid asphalt prices on their website at:

http://www.maine.gov/mdot/contractors/bidderinfo/asphalt.shtml

Prices may not be available for the month in which the project is Bid at the time the project is advertised for Bid. The Base Price will be confirmed after Contract Award and before the first monthly payment requisition. For this project, the recent Base Price History for the specified items is presented within Table 1.

Table 1 –Base Price History

Description	Unit	5/23/2022	5/31/2022	6/6/2022
Liquid Asphalt	per ton	$735.00	$745.00	$775.00

N/A = Not Available

1.2 MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT MIXTURES

A. Method of Measurement: The quantity of the hot mix asphalt (HMA) mixtures will be measured under the respective Bid Item(s) in the Contract. The Price Adjustment will be made based on the quantity installed during the monthly payment period.

B. Basis of Payment: The Contract Price of the hot mix asphalt (HMA) mixtures will be paid under the respective Bid Item(s) in the Contract. The Contract includes an allowance to be used for all price adjustments including price adjustments for Hot Mix Asphalt Mixtures. The Price Adjustment will be based on the variance in price for the liquid asphalt component only from the Base Price to the Period Price only. The adjustment shall not include transportation or other charges. Since the posted Prices may not be available before the end of the active work month for inclusion in the Payment Application, the Price Adjustment will be assessed in the following month's Payment Application once pricing information for the period is available.

1. Base Price: The Base Price of Hot Mix Asphalt Mixtures will be the price as indicated on the MDOT website (http://www.maine.gov/mdot/contractors/bidderinfo/asphalt.shtml) for the month in which the contract was bid , which includes State Tax.
2. Period Price: The Period Price will be the average of prices charged to the State, including State Tax for the bulk purchases made during each month as posted on the MDOT website.

3. The Contract Price of the hot mix asphalt mixture will be paid under the respective item in the Contract. The Price Adjustment, as herein provided, upwards or downwards, will be made after the work has been completed and accepted, using the monthly period price for the month during which the work was performed and will be paid under the Price Adjustment Allowance in the Payment Application.
4. The Price Adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the job in accordance with the Contract Documents and as measured for the Hot Mix Asphalt Work Item.
5. The Price Adjustment will be determined using the following formula; the quantity of tons of hot mix asphalt mixture placed during each monthly period multiplied by the liquid asphalt content percentage multiplied by the variance in price between Base Price and Period Price of liquid asphalt. The liquid asphalt content, for the purpose of this adjustment, will be 5.5% (0.055) for each ton of bituminous concrete mixture.
6. The Price Adjustment will be paid only if the variance from the Base Price is 10% or more for a monthly period. The complete adjustment will be paid in all cases for either a 10% upward or 10% downward adjustment.
7. No Price Adjustment will be allowed beyond the Substantial Completion Date of this Contract, unless an extension of time beyond the contractual Substantial Completion Date has been issued and approved by the Owner.
8. The Contractor warrants that its bid prices for this Contract include no allowances for any contingency to cover increased costs for items which adjustment is provided herein.
9. The City will not be responsible for computing or otherwise indicating price adjustments except to the prime contractor, which must make its own arrangements with subcontractors.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PREPARATION OF MONTHLY PAYMENT APPLICATION

A. Payment Applications shall be submitted monthly. Table 2 presents an example calculation for determining Price Adjustments for the specified items.

Note: In this example, the Payment Application for June will be submitted at the end of June or early in July and shall include all of the work performed during the month of June and Price Adjustments for the work performed in May.

For this example, 400 tons of full-width final bituminous pavement over 1,000 feet of roadway were completed in May.

Table 2 – Example Project Related Prices				
Description	Unit	Base Price	May 2013	June 2013
Hot Mix Asphalt	per ton	$600.00	$675.00	N/A

Based on the example Prices in Table 2, an assessment of whether or not Price Adjustments will be paid for this example is presented in Table 3.

Table 3 – Example Price Adjustment Assessment					
Item	Base Price	Period Price	Price Difference	% Change	Price Adjustment Required
Hot Mix Asphalt	$600.00	$675.00	$75.00	12.5%	Yes, >10%

As indicated in Table 3, Price Adjustments for this example would be required for Hot Mix Asphalt if work items were performed during the Month of May.

The following asphalt escalator formula by MDOT shall be used for calculating the price adjustment:

Price adjustment = (# of tons) x (price difference of period vs base price) x (% asphalt factor for that item).

Where "% asphalt factor" is equal to the average factor used for a particular HMA mix as found in Maine DOT Special Provision 108.4.1. Reference shall be to MaineDOT Standard Specifications, March 2020, incorporating revisions made up to December 12, 2020.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.

B. Related work described elsewhere: The Contractor's relations with their subcontractors and materials suppliers and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings content.

1.2 QUALITY ASSURANCE

A. 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.

1.3 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda.

B. Minutes: The Engineer will compile minutes of each project meeting and will furnish a copy to the Contractor. The Contractor may make and distribute such other copies as they wish.

PART 2 - PRODUCTS

(No products are required in this Section.)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

A. Except as noted below for Preconstruction Meeting, project meetings will be held monthly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

A. Meetings will be held at the job site in the Engineers' field office, unless the Owner and/or Engineer determine that virtual meetings are applicable and appropriate for any reason (e.g., COVID, Safety and Health Plan, etc.).

1. If meetings are required by Owner/Engineer to be held virtually, Engineer will host the meetings via Microsoft Teams. All required meeting attendees are responsible for providing hardware necessary to view, share, be heard and hear content of the meeting.

3.3 PRECONSTRUCTION MEETING

A. Preconstruction meeting will be scheduled within twenty days after the Effective Date of the Agreement, but before the Contractor starts work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance.

B. Minimum agenda: Distribute data on, and discuss:
   1. Identification of key project personnel for Owner, Engineer, Contractor, funding/regulatory Agencies.
   2. Responsibilities of Owner, Engineer, Resident Project Representative, Contractor.
   3. Channels and procedures for communications.
   4. Construction schedule, including sequence of critical work.
   5. Easements, permits.
   6. Contract Documents, including distribution of required copies of original documents and revisions.
   7. Processing of Shop Drawings and other data submitted to the Engineer for review.
   8. Processing of field decisions and Change Orders.
   9. Rules and regulations governing performance of the Work, including funding/regulatory Agency requirements.
   10. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

3.4 PROJECT MEETINGS

A. Attendance: To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work. The Superintendent shall attend. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.

B. Minimum agenda:
   1. Review, revise as necessary, and approved minutes of previous meeting.
   2. Review progress of the Work since last meeting, including status of submittals for approval.
   3. Review schedule of work to be accomplished prior to next meeting.
   4. Discuss monthly partial payment request.
   5. Review status of change order requests and Work Directive Changes.
   6. Identify problems which impede planned progress.
   7. Develop corrective measures and procedures to regain planned schedule.
   8. Complete other current business.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Within ten (10) days after the effective date of the Agreement between Owner and Contractor submit to the Engineer an estimated progress schedule as specified herein.

B. Form of Schedules:
   1. Narrative: Completely describe the construction methods to be employed.
   2. Network Analysis System:
      a. Provide a separate horizontal schedule line for each trade or operation and show concurrent and preceding activities.
      b. Present in chronological order the beginning of each trade or operation showing duration and float time.
      c. Scale: Identify key dates and allow space for updating and revision.
   3. Mathematical Analysis:
      a. A mathematical analysis shall accompany the network diagram. A computer printout will be acceptable.
      b. Information shall be included on activity numbers, duration, early start, late start, etc. and float times.

C. Content of Schedules:
   1. Provide complete sequence of construction by activity:
      a. Shop Drawings, Project Data and Samples:
         i. Submittal dates.
         ii. Dates reviewed copies will be required.
      b. Estimated product procurement and delivery dates.
      c. Dates for beginning and completion of each element of construction.
   2. Identify work of separate phases and logically grouped activities.
   3. Show the projected percentage of completion for each item of work as of the first day of each month.
   4. Provide separate sub-schedules, if requested by the Engineer, showing submittals, review times, procurement schedules, and delivery dates.
   5. Schedule sheets shall be printed in color on 24”x36” paper, unless a smaller size paper is allowed by the Engineer.

D. Updating:
   1. Show all work activities including those already complete.
   2. Show all changes occurring since previous submission.
   3. Indicate progress of each activity, show completion dates.
   4. Include:
      a. Major changes in scope.
      b. Activities modified since previous updating.
      c. Revised projections due to changes.
      d. Other identifiable changes.

5. Provide narrative report, including:
   a. Discussion of problem areas, including current and anticipated delay factors.
   b. Corrective action taken or proposed.
   c. Description of revisions that may affect schedules.
   d. Description of activities to be performed in the next 6-week period.
   e. Updated list of key shop drawings, project data and samples to be submitted in the next 6-week period.

1.2 SUBMITTALS

A. Submit updated schedules with each progress payment request.
B. Submit 4 copies of initial and updated schedules to the Engineer.

END OF SECTION

SECTION 01320

SAFETY AND HEALTH PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work, as outlined herein and in the General and Special Conditions of the Contract Documents. Within 10 days after the effective date of the Agreement between Owner and Contractor, submit to the Engineer a Safety and Health Plan as specified herein. Refer to submittals section below.
2. Contractor shall comply with all applicable Laws and Regulations related to the safety of persons or property, or for the protection of persons or property from damage, injury, illness, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
3. Contractor shall designate a qualified and experienced safety representative (OSHA defined "Competent Person") at the site whose duties and responsibilities shall be the prevention of accidents and maintaining and supervising of safety precautions and programs, including a "Job Hazards Analysis".
4. The Contractor shall be solely responsible to provide all labor, equipment, and utilities sufficient to ensure no construction noise, particulates, or odors, are allowed to accumulate to levels which adversely affect health or work in, or near the construction area.

B. Content of Safety and Health Plan:

1. Prepare complete safety and health plan in accordance with the requirements of CFR Title 29 Part 1926 - Safety and Health Regulations for Construction.
   a. Provide documentation that Contractor's hazardous communication program is up to date.
   b. Provide documentation that Contractor's safety training is up to date.
   c. Prepare a project specific Safety and Health Plan addressing construction safety and protection, including but not limited to excavations, fall protection, egress, as well as provisions for construction in hazardous environmental conditions, confined space entry, electrically-classified spaces, chemical storage/handling, biological hazards, etc., at the project site.

C. Updating:

1. Contractor shall be responsible for updating the Safety and Health Plan as appropriate throughout the course of the construction period.

1.2 SUBMITTALS

A. Submit the Contractor's site-specific Safety and Health Plan to the Engineer, in accordance with Section 01340. Submit hardcopy submittals, if required.

B. Submit updated Safety and Health Plans as necessary during the course of the project.
C. The Safety and Health Plan is provided "for information only" to inform the Owner, Engineer and Resident Project Representative of the project specific safety program requirements; however, if the Safety and Health Plan incomplete (e.g., missing elements relevant to the project work), inadequate (e.g., outdated qualifications) or not project-specific, it will be returned "revise and resubmit". Delays related to an incomplete Safety and Health Plan are the responsibility of the Contractor.
D. The Contractor will overview the plan with the Owner (and staff), Engineer (and Resident Project Representative) prior to work beginning at the project site, and subsequently when/if the safety plan is updated.
E. Contractor's most current Safety and Health Plan shall be available at the construction site throughout the construction project.

1.3 ON-SITE COORDINATION MEETINGS

A. Contractor shall review key aspects of Safety and Health Plan at the Pre-Construction Meeting, and subsequent on-site safety informational meeting.
B. Contractor shall report to Engineer and Owner at each progress meeting concerning compliance with the Safety and Health Plan for the most recent construction period and new considerations and requirements for the upcoming period.
C. Contractor shall hold weekly on-site coordination meetings with Resident Project Representative and Owner to ensure that Owner's staff is aware of key Safety and Health Plan requirements of the current phase of construction.

1.4 OWNER'S CONFINED SPACE ENTRY PROGRAM INFORMATION

A. A copy of the Owner's Confined Space Entry Program is available for viewing at the facility and is not included herein.

SITE-SPECIFIC INFORMATION

A. Refer to Tables 1, 2 and 3 below for site specific information, excluding items such as manholes, handholes, etc.

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.

B. Related Work Specified Elsewhere:
   1. Construction Schedules: Section 01310
   2. Project Record Documents: Section 01720
   3. General Conditions: Section 00700.

C. Submittals: This project shall utilize:
   1. Submittals – Electronic via Email/FTP with Hard Copy for Record
      a. The Contractor shall submit to the Engineer an electronic submittal of shop drawings in portable document format (PDF) transmitted via email or file transfer protocol (FTP). The Engineer shall return an electronic PDF of the submittal review comments to the Contractor for distribution to subcontractors, suppliers and manufacturers. The electronic submittals shall serve as the electronic record of the project.

1.2 SHOP DRAWINGS

A. Shop Drawings are required for each and every element of the work.

B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, their subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.

C. The Contractor shall provide a completed Contractor Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.
   1. Each shop drawing submittal shall include a complete copy of the relevant specification section markup up to reflect “compliance” or “deviation” on an item-by-item basis.

D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal. An exception to this requirement are shop drawings for reinforcing steel, miscellaneous metals and structural steel, which shall be submitted separately for each structure unless

otherwise permitted by the Engineer.

E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.

G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.

H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from their subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.

I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by their subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to confirm that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.

J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.

K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, Contractor shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established

for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two submission limit.

M. Shop Drawings that include drawings or other material that is illegible or too small may be returned without review.

N. American Iron & Steel certifications must be submitted with the initial shop drawing.

1.3 SAMPLES

A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available. Submittals of "samples" shall be documented through the electronic submittal process by including a photograph of the item(s) and indicating the date the sample was mailed and/or delivered.

1.4 SUBMISSION REQUIREMENTS

A. Accompany submittals with a transmittal cover sheet, containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
      a. Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).
      b. Under limited situations when additional different pieces of equipment are submitted under the same specification section, those submittals shall be numbered sequentially (e.g. 05500-01, 05500-02, 05500-03, etc.).
      c. Resubmittals shall include an alphabetic suffix after the corresponding sequential number (e.g., 16000-01A).
      d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters "OM", another dash, and then a sequential number beginning with 01 (e.g. 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g. 16000-OM-01A).
   5. Notification of deviations from Contract Documents.
   6. Other pertinent data.

B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
   1. Project name
   2. Specification Section and sequential number with alphabet suffix for resubmittal
   3. Description
   4. Identification of deviations from Contract Documents.
   5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.

6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
7. Where specified, manufacturer's guarantee.

C. Additional Requirements for Electronic Submittals:
1. Each individual shop drawing or O&M submittal shall be contained in one PDF.
2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
5. The electronic PDF shall be configured such that is fully searchable.
6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

1.5 RESUBMISSION REQUIREMENTS

A. Revise initial submittals as required and resubmit as specified for initial submittal.
B. Indicate on submittals any changes which have been made other than those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer. If relabeling of individual pieces or assemblies has taken place, the labels from the previous submittal shall be indicated to assist in comparing the original and resubmitted shop drawing.
C. All resubmittals shall include a summary of the previous submittal review comments with the vendors' written response as to how the previous comments were addressed.

1.6 ENGINEER'S REVIEW

A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.
2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the

Contractor, unless otherwise notified in writing prior to execution of the relevant work.

3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of review comments. Remarks will explicitly list what information needs to be resubmitted. Resubmittal from the Contractor should include a cover letter or summary which indicates how each review comment has been addressed. **This action code will not be used, or will be sparingly used, for electronic submittals.**
4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted, but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter which indicates how each review comment has been addressed and where to find the information in the resubmittal.
5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
6. For Information Only (Status 5 on shop drawing log). The shop drawing review was for information only.
7. In Review (Status 6 on shop drawing log). The shop drawing is currently under review.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

SHOP DRAWING NUMBER: _____ (SPECIFICATION SECTION OR DRAWING NO:) - _____ (SEQUENTIAL NUMBER (& ALPHA SUFFIX FOR RESUBMITTAL))

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

☐ NO DEVIATIONS

or

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS[a]:

_____
_____
_____
_____

By: _____ By: _____

Contractor[b]

Manufacturer[c]

Date: _____ Date: _____

a Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.
b Required on all submittals
c When required by specifications Page ___ of ___

General Contractor's Stamp

END OF SECTION

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Pre-Construction Record: Contractor shall take digital photographs and video to obtain a visual record of the project area prior to beginning any work at the project site.
2. Notify Engineer at least three (3) working days prior to photographing or videoing the project area so Engineer may, at their option, observe.

1.2 QUALITY

A. Pre-Construction Record: Quality shall be such that the condition of existing pavement, curbing, driveway entrances, sidewalks, landscaping, piping, etc. can be readily determined.

1.3 SUBMITTAL OF PRINTS

A. Pre-Construction Record:

1. Submit pre-construction photographs/videos in accordance with Section 01340 prior to initiating any work on-site.

B. The quality of the photos and video are subject to approval by the Engineer.

C. Photographs and videos taken for the project and submitted are released to the Owner and Engineer for reproduction and use for records retention, governmental and commercial purposes.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. General Quality Control.
B. Workmanship.
C. Manufacturer's Instructions.
D. Manufacturer's Certificates.
E. Manufacturer's Field Services.
F. Testing Laboratory Services.

1.2 RELATED REQUIREMENTS

A. Section 00700 - General Conditions: Inspection and testing required by governing authorities.
B. Section 01340 - Submittals: Submittal of Manufacturer's Instructions
C. Section 02200 - Earthwork
D. Section 02513 – Bituminous Concrete Paving
E. Section 03300 - Cast-in-Place Concrete

1.3 QUALITY CONTROL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.4 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
B. Perform work by persons qualified to produce workmanship of specified quality.
C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.5 MANUFACTURERS' INSTRUCTIONS

A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

1.6 TESTING LABORATORY SERVICES

A. Owner will employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services wherever an Independent Testing Laboratory is required by individual specification sections listed in paragraph 1.2 above, unless otherwise indicated.
B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
C. Reports will present observations and test results and indicate compliance or non-compliance with specified standards and with Contract Documents. Independent

Testing Laboratory will submit one copy of each report directly to each of the following: Engineer, Resident Project Representative, Contractor. Reports will be submitted within 5 days of obtaining test results. If test results indicate deficiencies, Independent Testing Laboratory shall telephone or email results to Engineer, Resident Project Representative and Contractor within 24 hours.

D. Contractor shall cooperate with Independent Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.

E. Contractor shall notify Engineer at least one full working day prior to needing testing laboratory services. Engineer will notify Independent Testing Laboratory. If scheduled tests or sampling cannot be performed because the work is not ready as scheduled, testing costs associated with the delay will be determined by Engineer and invoiced by Owner to Contractor. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. If adequate notice is not provided, Contractor shall suspend work on that portion of the Project until testing can be performed. Such suspension will not be grounds for a claim against the Owner for delay, nor will it be an acceptable basis for an extension of time.

F. Payment for Independent Testing Laboratory services shall be as follows:
   1. General: Where testing is the Owner's responsibility, payment will be made as stated below unless other requirements are given in Specification Sections. Testing which is the responsibility of the Contractor will be considered an incidental item unless otherwise indicated in Section 01150, Measurement and Payment.
   2. Initial Testing: Owner will pay for initial tests.
   3. Retesting: Costs of retesting due to non-compliance will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.
   4. Contractor's Convenience Testing: Inspections and tests performed for Contractor's convenience will be paid for by Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide and pay for all temporary applicable utilities required to properly perform the Work at no additional cost to the Owner including the placement and removal of the utilities.
2. Completely remove all temporary equipment and materials upon completion of the Work and repair all damage caused by the installation of temporary utilities.
3. Make all necessary applications and arrangements for electric power, light, water and other utilities with the local utility companies. Notify the local electric power company if unusually heavy loads, such as welders, will be connected.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Obtain permits as required by local governmental authorities.
2. Obtain easements, when required, across private property other than that of the Owner for temporary power service.
3. Comply with the latest National Electrical Code.
4. Comply with all local, State and Federal codes, laws, and regulations.

B. All temporary utilities are subject to the approval of the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water and Sanitary:

1. The General Contractor shall make necessary arrangements for connection to the municipal water supply and shall provide, at their own expense, any extensions as required for the operation of this project. The General Contractor shall bear all costs incurred for the temporary water services, including the costs of the water itself.
2. All lines, temporary or permanent, shall be protected and maintained by the General Contractor. Temporary lines shall be removed by the General Contractor when the temporary service is no longer required.
3. The General Contractor shall provide an adequate drinking water supply, satisfactorily cooled, for their employees.
4. See Site Plan for nearest water hook-up.
5. The General Contractor shall furnish, install, maintain and pay for adequate temporary chemical type toilet accommodations, for all persons employed on the work and located where approved by the Engineer. The accommodations shall be in proper enclosures and in accordance with Municipal Ordinances and

shall be maintained in proper, safe and sanitary conditions and suitably heated when requested.

6. Relocate temporary toilet facilities as required to facilitate the construction.
7. Remove all temporary facilities at completion of work when directed by the Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Water:
   1. Provide and maintain water for drinking and construction purposes as required for the proper execution of the Work.

B. Sanitary Accommodations:
   a. Provide and maintain sanitary accommodations for the use of the employees of the General Contractor, subcontractors, and Engineer.
   b. Sanitary accommodations shall meet the requirements of all local, State and Federal health codes, laws and regulations.

END OF SECTION

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.1 DESCRIPTIONS

A. Work Included:

1. Furnish and apply water or calcium chloride on the road surfaces within the construction site, when required to control dust and when directed by the Engineer.
2. When dust control is not included as a separate item in the Contract, the work shall be considered incidental to the appropriate items of the Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water for Sprinkling:

B. Clean, free of salt, oil, and other injurious matter.

C. Calcium Chloride:

1. Meet the requirements of AASHTO M144.

PART 3 - EXECUTION

3.1 APPLICATION

A. Water:

1. Apply water by methods approved by the Engineer.
2. Use approved equipment including a tank with gauge equipped pump and spray bar.

B. Calcium Chloride:

1. Apply at a rate sufficient to maintain a damp surface but low enough to assure non-contamination of water courses.
2. Apply water prior to calcium chloride addition.

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Provide all materials and perform all work necessary to completely regulate traffic in the area of Work.
   2. Perform all work in such a manner as to provide safe passage at all times for the public and with a minimum of obstruction to traffic.
   3. Do not close roads or streets to passage of the public without the permission of the proper authorities.

B. The local police department will decide if safe passage is being maintained and shall have the authority to require the Contractor to take any additional steps necessary to maintain safe passage. If the Authority furnishes an inspector on the job as a result of poor traffic control by the Contractor, the Contractor shall be responsible for all costs assessed by the Authority (State Highways).

C. Minimize the length of delays or traffic stoppage to the extent practicable. Maximum traffic stoppage time shall be 10 minutes.

D. Develop a project specific traffic control plan that meets the requirements of Manual of Uniform Traffic Control Devices (MUTCD) and any local and state requirements. Proposed Traffic Control Plan shall indicate signs/locations to be used. Traffic Control Plan submittal to the Engineer will be for general information only.

E. The Contractor's designated traffic control representative shall respond to all traffic safety complaints and be available to direct traffic control subcontractors the entire time work is occurring on site. If the designated representative is not on site for a period of time, another on site representative shall be designated by the Contractor for that period.

1.2 SCHEDULING WORK

A. During the Project Pre-Construction Meeting one Contractor representative will be designated as the coordinator between the Police Department and subcontracted traffic control.

B. Schedule all work so that two adjacent parallel streets are not closed to passage by the public at any one time, if at all possible.

C. Revise the plan of work if it will create a traffic hazard or an unreasonably long detour.

D. Do not start work in any new location without the permission of the Engineer.

E. Notify all police and fire departments of all scheduled detours and when streets are reopened.

PART 2 - PRODUCTS

2.1 WARNING SIGNS AND BARRICADES

A. Traffic control (plans, methods and devices) shall be as outlined in Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) as published by U. S. Department of Transportation, and any local and state requirements.

B. Provide adequate warning signs, barricades, signal lights, flaggers/uniformed police officers, and take other necessary precautions for the safety of the public.

C. Provide and illuminate suitable warning signs to show where construction, barricades or detours exist.

D. Provide barricades of substantial construction and painted with a finish that increases visibility at night, as outlined in the MUTCD.

E. Keep signal lights illuminated at all barricades and obstructions from sunset to sunrise.

F. Maintain all necessary signs, barricades, lights, flaggers, crew and other safety precautions during authorized suspension of the Work, weekends, holidays or other times when the Work is not in progress.

G. Contractor shall make periodic inspection throughout the day of the traffic control patterns, methods, signs and other devices to ensure that they are properly placed.

2.2 FLAG PERSON

A. A flag person is a trained and certified individual assigned specifically to the task of directing traffic and is outfitted in the necessary high visibility vest and apparel needed for traffic control.

B. Flag persons shall be provided by the Contractor.

PART 3 - EXECUTION

3.1 DETOURS

A. Provide, identify and maintain suitable detours when the project, or any part thereof, is closed to public travel.

B. When the closed part of the project is reopened, restore the detour area and any other disturbed areas to the original condition.

3.2 INCONVENIENCE TO RESIDENTS OF VICINITY

A. Whenever a traveled way is closed, perform the Work in such a manner that local travel, residents and businesses in the vicinity of the Work will be inconvenienced as little as possible.

B. Allow access to residents and abutting land owners along the project to driveways and other normal outlets from their property.

END OF SECTION

SECTION 01710

PROJECT CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
2. At completion of work, remove waste materials, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for use.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Conduct cleaning and disposal operations in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Cleaning During Construction:

1. Execute cleaning operations to ensure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
2. Entirely remove and dispose of material or debris during the progress of the work that has washed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations.
3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
4. At reasonable intervals during the progress of work, clean the site and dispose of waste materials, debris, and rubbish.
5. Clean interiors of buildings, when applicable, prior to finish painting, and continue to clean on an as-needed basis until buildings are ready for occupancy.
6. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw material from heights.
7. When applicable, schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

B. Control of Hazards:
   1. Store volatile wastes in covered metal containers, and remove from premises daily.
   2. Prevent accumulation of wastes which may create hazardous conditions.
   3. Provide adequate ventilation during use of volatile or noxious substances.

C. Disposal:
   1. Do not burn or bury rubbish and waste materials on project site.
   2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
   3. Do not dispose of wastes into streams or waterways.

D. Final Cleaning:
   1. Employ experienced workers, or professional cleaners, for final cleaning.
   2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from all sight-exposed interior and exterior finished surfaces.
   3. Repair, patch and touch up marred surfaces to specified finishes.
   4. Broom clean paved surfaces.
   5. Rake clean non-paved surfaces of the project site.
   6. Restore to their original condition those portions of the site not designated for alterations by the Contract Documents.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Keep accurate record documents for all additions, demolition, changes of material or equipment (from that shown on the Drawings), variations in work, and any other additions or revisions to the Contract (via Change Order, Work Change Directive, Field Order or Clarification).

B. Related Work Specified Elsewhere:
   1. Shop Drawings, Project Data, and Samples are specified in "General Conditions" and Section 01340, Submittals.
   2. Electrical System Record Drawing requirements are outlined in Section 16010.

1.2 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:
   1. Contract Drawings
   2. Specifications
   3. Addenda
   4. Reviewed Shop Drawings
   5. Change Orders
   6. Any other modifications to the Contract
   7. Field Test Reports

B. Store documents in files and racks specifically identified for Record Drawing use, that are apart from documents used for construction.

C. File documents in a logical manner indexed for easy reference.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by the Engineer and Owner, and by the end of the project, transmit these documents to the Engineer.

G. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests.

1.3 RECORDING

A. Label each document "PROJECT RECORD" in large high printed letters.

B. Keep record documents current and do not permanently conceal any work until required information has been recorded.

C. General Field Recording Issues:
   1. All swing ties shall be taken from existing, permanent features such as utility poles, corners of buildings and hydrants. Porches, sheds or other house additions shall be avoided as they could be torn down. A minimum of two swing ties shall be taken. Survey grade GPS coordinates are also acceptable.
   2. Stations shall be recorded to the nearest foot.

3. Inverts shall be recorded to the nearest hundredth of a foot.
4. Elevations shall be recorded to the nearest hundredth of a foot.
5. Equipment and Piping shall be recorded to the nearest tenth of a foot, and the overall dimensions and layout of the equipment shall be adjusted to reflect the equipment provided.

D. Project Record Drawings - Legibly mark Contract Drawings to record existing utilities and actual construction of all work, including but not limited to the following (where applicable):
   1. Existing Utilities
      a. Water mains and services, water main gate valves, sewer mains and services, storm drains, culverts, steam lines, gas lines, tanks and other existing utilities encountered during construction must be accurately located and shown on the Drawings. In congested areas supplemental drawings or enlargements may be required.
      b. Show any existing utilities encountered in plan and profile and properly labeled showing size, material and type of utility. Ties shall be shown on plan. Utility shall be drawn to scale in section (horizontally and vertically) and an elevation shall be called out to the nearest hundredth of a foot.
      c. When existing utility lines are broken and repaired, ties shall be taken to these locations.
      d. If existing water lines are replaced or relocated, document the area involved and pipe materials, size, etc. in a note, and with ties.
   2. Manholes, Catch Basins, and other structures.
      a. Renumber structure stationing to reflect changes.
      b. Show ties to center of structure covers or hatches.
      c. In general, show inverts at center of structures. However, for manholes with drop structures, or steep channels (greater than 0.2' change on slope), show inverts at face of manhole.
      d. Show inverts for other structures at the face of the structure.
      e. Draw any new structures that are added on plan and profile.
      f. Show any field or office redesigns.
      g. Redraw plan if the structure's location is moved more than 5 feet in any direction. Note: It is important to show existing utilities, as outlined in Paragraph 1 above, especially if they were one reason for relocating the sewer, manholes and other structures.
      h. Redraw profile if inverts changed by more than 6 inches.
   3. Gravity Sewer Line
      a. Change sewer line slopes indicated on Drawings if inverts are changed.
      b. Draw any new gravity lines that are added on plan and profile.
      c. Show any field or office redesigns.
      d. Redraw the sewer line profile if manhole inverts are redrawn.
      e. Redraw the sewer line on plan corresponding to relocated manholes.
   4. Ledge
      a. Ledge profiles shall be shown. Note whether the plotted ledge profile reflects undisturbed or expanded conditions.
   5. Roads

a. Show centerline road profile and level spot elevations.
b. Show pavement widths.
c. On road cross sections, show the pavement cross slope.
d. Show any deviations from the design plans.

6. Utilities
   a. When encountered, additional utilities (e.g., gas, cable, telephone, fiber optic, etc.) shall be indicated on the Record Drawings.

E. Specifications and Addenda - Legibly mark up each section to record:
   1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
   2. Changes made by Change Order, Field Order, or other method.

1.4 SUBMITTALS

A. At the completion of the project, and prior to the release of retainage, deliver record documents to the Engineer.
   1. Record drawings shall be provided as a bound, red-line paper set and an electronic file (pdf format) consisting of a full scan of the bound paper set.

B. Accompany submittal with transmittal letter, in duplicate, containing:
   1. Date, project title and number.
   2. Contractor's name and address.
   3. Title and number of each record document with certification that each document is completed and accurate.
   4. Signature of Contractor, or their authorized representative.

C. Failure to supply all information on the Project Record Drawings as specified in Part 1.3 may result in withholding final completion and in non-approval of final payments of the Contract. If Contract Time has elapsed, this shall be grounds for imposing liquidated damages.

1.5 QUALITY ASSURANCE

A. All horizontal and vertical dimensions, swing-ties, and elevations shall be accurate to within one-tenth of a foot, unless greater accuracy is specified elsewhere in the Specifications (e.g., concrete elevations, weir elevations, etc.).

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 MAINTAINING AND PROVIDING RECORDS

A. Records shall be kept current as the work progresses.

B. Records shall be made available for review by the Owner, Engineer, Resident Project Representative and/or Funding Agency(s) upon request.

C. Records shall be kept current as the work progresses. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests. Failure to provide records shall also be grounds for withholding of final payment and, if beyond contract time, shall be grounds for imposing liquidated damages.

3.2 AS-BUILT SURVEY PERFORMANCE

A. From established survey control, and construction baseline as shown on the drawings, conduct surveys of the project area during construction as needed to obtain information of buried and above ground items. Surveys shall include information outlined in Section 1.3.

B. Actual road alignments; walls; fence and guardrail; existing, new and relocated utility poles; traffic and warning sign locations; crosswalks, parking space and stop bar locations; retaining walls and foundations drains; all underground and overhead utility poles and lines within the project limits, including those installed on private property; all other new features and appurtenances and those existing features and appurtenances changed as a result of this project shall be included in the survey.

3.3 FORMAT FOR ELECTRONIC DELIVERABLES

A. AutoCAD digital survey data for the as-built survey shall include:
   1. Copy of field notes and sketches of the survey.
   2. Paper copy of description of layers.
   3. Paper copy of base map.
   4. Provide digital information on compact disk with paper copy printout; information shall be provided in .DWG format (AutoCAD 2011 or earlier). Data shall be provided in 3D format (northing, easting, elevation, or Y, X, Z).
   5. Drawing scale: Minimum one inch = twenty feet.
   6. Layering:
      a. Repetitive symbols made into blocks and defined on layer 0.
      b. All entities shall be drawn “by layer” as opposed to individual properties.
      c. Use one linetype and one color per layer as opposed to numerous colors/linetypes on a single layer.
      d. Preface each layer with the initials of the Survey company or Contractor (example, Survey Company: SC “layername”).
      e. Database text annotation will be coordinated so the text will be right-reading.
      f. Place text on separate layers.

B. ESRI GIS digital survey data for the as-built survey shall include:
   1. All lines and points shall be accompanied by the attributes listed in Tables 1, 2, and 3 with consistent formatting and punctuation (e.g. 6, 8, 12, not 6”, 8, 10”, 12), and shall be provided in an ESRI geodatabase that may be easily imported by the Owner into their GIS System.

WRIGHT-PIERCE
Engineering a Better Environment

SANITARY SEWER SERVICE LOCATION

Project:		Date:	
Date Installed:		Town, City of:	
Type, Size of Service Pipe		Street	
Connection at Sewer Main		Dwelling No.	
Depth, End of Service		Occupant	
Length of Service Pipe Laid		Owner	
Measured, Located By		House No.	
Project Contractor		Complete	
		Incomplete	

N.T.S.

Comments: _____

Observed By:

Contractor	(Date)
Wright-Pierce	(Date)

Table 1
Sewer - GIS Attribute Table

Field	Description
Casing	
INSTALLDATE	The date the asset was installed
DIAMETER	The diameter of the asset
MATERIAL	Material the casing is manufactured with
RECORDLENG	Recorded length of the casing
CASEINVUP	Invert elevation of the casing (upstream)
CASEINVDOWN	Invert elevation of the casing (downstream)
Clean - Out	
FACILITYID	Locally assigned Facility Identifier = "CO"
ACCESSMAT	Access material for lid or cover
CORIM	Rim elevation of the clean out
COINV	Invert elevation of the clean out
INTDEPTH	Interior Depth
INSTALLDATE	The date the asset was installed
DEVICETYPE	The type of cleanout
ACCESSDIAM	Access diameter for the clean out
Gravity Main	
FACILITYID	Locally assigned Facility Identifier - US/DS
INSTALLDATE	The date the asset was installed
MATERIAL	Material the asset is manufactured with
DIAMETER	The diameter of the asset
MAINSHAPE	The shape of the gravity main
FROMMH	From Manhole
TOMH	The downstream manhole
WATERTYPE	Indicates the type of water in the pipe = "Sewer"
DOWNELEV	The downstream pipe elevation
UPELEV	The upstream pipe elevation
SLOPE	The slope of the pipe from outside face of structure
CALCPIPELENGTH	The pipe length used to calculate slope
Lateral Lines (separated & combined)	
INSTALLDATE	The date the asset was installed
MATERIAL	Material the asset is manufactured with
DIAMETER	The diameter of the asset
WATERTYPE	Indicates the type of water in the pipe = "Sewer"

Table 1
Sewer - GIS Attribute Table

Field	Description
Lateral Line Points	
INSTALLDATE	The date the asset was installed
MATERIAL	Material the asset is manufactured with
DIAMETER	The diameter of the asset
WATERTYPE	Indicates the type of water in the pipe = "Sewer"
ELEV	Elevation at the top of the asset
Sewer Manholes	
FACILITYID	Locally assigned Facility Identifier
INSTALLDATE	The date the asset was installed
HIGHELEV	High pipe elevation inside manhole - for drop
DEPTH	The depth of the manhole
INVERTELEV1	Invert elevation 1
INVERTELEV2	Invert elevation 2
INVERTELEV3	Invert elevation 3
RIMELEV	The elevation of the manhole rim
CVTYPE	The type of sewer manhole cover
WALLMAT	The manhole wall material = Brick, Block, or Concrete
MHTYPE	The type of manhole - Size and Shape
CONDITION	The condition of the asset = Excellent
GPSDATE	Date the feature was located with GPS
WATERTYPE	Indicates the type of water in the pipe = "Sewer"

Table 3
Drainage - GIS Attribute Table

Field	Description
Casing	
INSTALLDATE	The date the asset was installed
DIAMETER	The diameter of the asset
MATERIAL	Material the casing is manufactured with
RECORDLENG	Recorded length of the casing
CASEINVUP	Invert elevation of the casing (upstream)
CASEINVDOWN	Invert elevation of the casing (downstream)
Culverts	
INSTALLDATE	The date the asset was installed
MATERIAL	Material the asset is manufactured with
DIAMETER	The diameter of the asset
MAINSHAPE	The shape of the culvert
OWNEDBY	Indicates which organization owns the asset = City
MAINTBY	Indicates which organization maintains the asset = City
DOWNELEV	Downstream invert elevation
UPELEV	Upstream invert elevation
SLOPE	Culvert slope
Discharge Point	
DISCHRGTYP	The type of stormwater discharge = Stormwater
PERMIT	Permit Name
PERMITID	Unique permit identifier
INSTALLDATE	The date the asset was installed
DIAMETER	The diameter of the asset
Stormwater Gravity Main	
INSTALLDATE	The date the asset was installed
MATERIAL	Material the asset is manufactured with
DIAMETER	The diameter of the asset
MAINSHAPE	The shape of the gravity main
FROMMH	The upstream structure
TOMH	The downstream structure
OWNEDBY	Indicates which organization owns the asset = City
MAINTBY	Indicates which organization maintains the asset = City
DOWNELEV	The downstream elevation where the pipe meets the structure
UPELEV	The upstream elevation where the pipe meets the structure
SLOPE	The slope of the main from outside face of structure
CALCPIPELENGTH	The pipe length used to calculate slope

Table 3
Drainage - GIS Attribute Table

Field	Description
Inlet (typically found along side of roads or in drainage swales)	
INSTALLDATE	The date the asset was installed
INLETTYPE	The type of stormwater inlet = Pipe, Beehive, or Headwall
ACCESSDIAM	Access diameter for the inlet
INVERTELEV	Invert elevation
ACCESSMAT	Access material for lid or cover
ACCESSTYPE	Method for accessing the opening = Remove Grate
Manhole and Catch Basin	
FACILITYID	Locally assigned Facility Identifier
INSTALLDATE	The date the asset was installed
HIGHELEV	High pipe elevation inside manhole - for drops
INVERTELEV1	Invert elevation 1
INVERTELEV2	Invert elevation 2
INVERTELEV3	Invert elevation 3
INVERT	The depth of the structure from rim to bottom
RIMELEV	The elevation of the structure rim
CVTYPE	The type of stormwater structure cover
WALLMAT	Wall Material = Brick, Block, or Precast Concrete
MHTYPE	The type of structure = Concentric, Eccentric, or Flat Slab
CONDITION	The condition of the asset = Excellent
GPSDATE	Date the feature was located with GPS
MAINTBY	Indicates which organization maintains the asset = City
Network Structure - (Pump Stations, etc)	
FACILITYID	Locally assigned Facility Identifier
INSTALLDATE	The date the asset was installed
OPDATE	Date when the facility was put into service
STRUCTTYPE	Type of Sewer Network structure
System Valves	
INSTALLDATE	The date the asset was installed
DIAMETER	The diameter of the asset
VALVETYPE	Type of control valve
ELEV	Elevation at the top nut of valve

END OF SECTION

SECTION 02050A

DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall furnish all labor, materials, tools, equipment and apparatus necessary and shall do all work required to complete the demolition, removal, and alterations of existing facilities as indicated on the Drawings, as herein specified, and/or as directed by the Engineer.
2. Demolition and alteration work within occupied areas shall be accomplished with minimum interference to the occupants and to the plant which shall be in continuous operation during construction.
3. All equipment, piping, and other materials that are not to be relocated or to be returned to the Owner shall become the property of the Contractor and shall be disposed of by him, away from the site of the work and at his own expense.
4. All demolition or removal of existing structures, utilities, equipment, and appurtenances shall be accomplished without damaging the integrity of existing structures, equipment, and appurtenances to remain, to be salvaged for relocation or stored for future use.
5. Such items that are damaged shall be either repaired or replaced at the Contractor's expense to a condition at least equal to that which existed prior to the start of his work.
6. Unless otherwise indicated, all items labeled to be "removed", "demolished" or "remove/demolish" shall be removed and disposed of off site in accordance with all Local, State and Federal Regulations.
7. The Contractor shall not collect any samples of either Building Materials, Wastes, Soils, or any other site/project related materials, nor have the samples analyzed for any reason without prior written approval from the Owner or Engineer. Furthermore, the Contractor shall not hire or contract with another party or Consultant to conduct sampling of either Building Materials, Wastes, Soils, or any other site/project related materials or to conduct analytical analysis.
    a. All sampling requests are to be directed in written format to the Owner and Engineer.
    b. By collecting unauthorized samples, the Contractor shall assume any and all financial burden of the required corrective action.
    c. If a sample is collected and analyzed without prior written approval from the Owner or Engineer, the Contractor shall be responsible for any and all remediation required by any applicable regulatory authority arising from or related to the samples collected and analyzed, as the validity of the materials sampled, sample locations and sampling protocols utilized cannot be confirmed by the Owner's or Engineer's independent Consultant.

B. Related Work Specified Elsewhere: (When Applicable)
   1. Earthwork is specified in Section 02200.
   2. Use of Explosives is specified in Section 01546.
   3. See Summary of Work, Section 01010.

1.2 JOB CONDITIONS
A. Condition of Structures:
   1. The Owner assumes no responsibility for the actual condition of structures to be demolished.
   2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner as far as practicable. However, variations within the structures may occur due to Owner's removal and salvage operations prior to the start of demolition work (where applicable).

1.3 UTILITIES
A. Utility Locations:
   1. Utility locations shown on the plans are approximate only, based on information supplied by the utility companies.
B. Coordination with Utilities:
   1. The Contractor shall make all necessary arrangements and perform any necessary work to the satisfaction of affected utility companies and governmental divisions involved with the discontinuance or interruption of affected public utilities and services.

1.4 SUBMITTALS
A. Schedule - Demolition:
   1. Submit two (2) copies of proposed methods and operations of demolition to the Engineer for review prior to the start of work. Include in the schedule the coordination for shut-off, capping and continuation of utility services as required.
   2. Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the Owner's operations.

1.5 PROTECTIONS
A. Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to adjacent buildings, struc¬tures, other facilities and persons. Erect temporary, covered passageways as required by authorities having jurisdiction.
B. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.6 DAMAGES
A. The Contractor shall promptly repair damages caused by demolition operations to adjacent facilities at no cost to the Owner.

PART 2 - PRODUCTS – Not Applicable

PART 3 - PERFORMANCE

3.1 GENERAL

A. Remove and dispose of non-salvageable material in accordance with all applicable local and state laws, ordinances and code requirements.
B. Dispose of material daily as it accumulates.
C. Carefully remove, store and protect from damage all materials to be salvaged.
D. Buildings and Adjacent Property:
    1. Protect all buildings and property adjacent to equipment to be removed from damage by erecting suitable barriers or by other suitable means.
    2. Leave such buildings in a permanently safe and satisfactory condition.
E. Maintaining Traffic:
    1. Ensure minimum interference with roads, streets, driveways, sidewalks and adjacent facilities.
    2. Do not close or obstruct streets, sidewalks, alleys or passageways without permission from authorities having jurisdiction.
F. Salvage:
    1. Salvaged items shall be stored on site for the Owner in an acceptable location and manner.

END OF SECTION

SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Clearing and grubbing includes, but is not limited to, removal of trees, brush, stumps, wooded growth, grass, shrubs, poles, posts, signs, fences, culverts and other vegetation and minor structures; the protection of designated wooded growth; the storage and protection of minor structures and materials which are to be replaced; and the disposal of nonsalvageable structures and materials, and necessary preliminary grading.

B. Limits of Work:
   1. Perform clearing and grubbing work within the areas required for construction, or as shown on the Drawings, to a depth of l2 inches below the existing grade.
   2. Perform additional clearing and grubbing work within areas and to depths which, in the opinion of the Engineer, interfere with excavation and/or construction, or are otherwise objectionable.

C. Work Not Included:
   1. Clearing and grubbing work performed for the convenience of the Contractor will not be considered for payment.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Dispose of combustible material by burning only when permitted by and in accordance with all applicable local and state laws, ordinances and code requirements.

B. Remove and dispose of nonsalvageable structures and material in accordance with all applicable local and state laws, ordinances and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide all materials required to complete the work.

B. All timber and wood shall become the property of the Contractor unless other agreements are made between the Owner and the Contractor.

C. Repair any damage to structures to the complete satisfaction of the Owner and Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Carefully preserve and protect from injury all trees and/or shrubs not to be removed.
B. Right-of-way:
   1. Where excavation is required on public or private rights-of-way containing trees, shrubs, other growth, or any structure or construction, obtain the Engineer's direction concerning the extent to which such obstacles can be cleared or stripped prior to performing the Work.
   2. In all rights-of-way, remove only those particular growths or structures which are, in the opinion of the Engineer, essential for construction operations.
   3. All other removals or damage shall be replaced or restored at the Contractor's expense.

3.2 PERFORMANCE

A. Clearing:
   1. Remove and dispose of all trees, brush, slash, stubs, bushes, shrubs, plants, debris and obstructions within the area to be cleared, except any areas that may be designated as "Selective Clearing", and except as otherwise shown on the Drawings or as directed by the Engineer.
   2. Remove all stumps unless otherwise directed by the Engineer.
   3. Dispose of material to be removed daily as it accumulates.
   4. Take special care to completely dispose of all elm trees and branches immediately after cutting either by burial in approved locations or, when permitted, by burning in areas well removed from standing elm growth.
B. Protection of Wooded Growth:
   1. Fell trees toward the center of the area being cleared to protect trees and shrubs to be left standing.
   2. Cut up, remove and dispose of trees unavoidably falling outside the area to be cleared.
   3. Employ skilled workmen or tree surgeons to trim and repair all trees that are damaged but are to be left standing.
C. Selective Clearing:
   1. When shown on the Drawings and when directed by the Engineer, perform selective clearing work to preserve natural tree cover.
   2. Perform selective clearing work only under the direction and supervision of the Engineer.
   3. Remove all dead and uprooted trees, brush, roots and other material which, in the opinion of the Engineer, are objectionable.
   4. Cut flush with the ground and remove only those trees indicated by the Engineer.
   5. Employ skilled workmen or tree surgeons to carefully trim all branches requiring cutting on trees to be left standing. Wood exposed as the result of removal of branches is to be left exposed to air and sunlight.
   6. Bituminous paint shall not be used on wood exposed as a result of branch removal, excavation around roots, or damage to tree bark.
D. Grubbing:

1. Perform grubbing work beneath new roads, driveways, walks, seeded areas and other areas and as directed by the Engineer.
2. Grub out all sod, vegetation and other objectionable material to a minimum depth of l2 inches below the existing grade.
3. Completely remove all stumps, including major root systems.

E. Disposal:
1. Remove from the site and dispose of material not being burned.
2. Provide an approved disposal area unless otherwise specified.

F. Burning:
1. Dispose of combustible materials by burning, only if approved by local and state officials.
2. Employ competent workmen to perform burning work in such a manner and at such locations that adjacent properties, trees and growth to remain, overhead cables, wires and utilities will not be jeopardized.
3. Do not leave fires unguarded.
4. Do not burn poison oak, poison ivy or other plants of similar nature.
5. Do not use tires or other combustible waste material to augment burning.
6. Burn combustible materials daily as the work progresses.
7. The Contractor shall be responsible for all damage caused by burning and shall be responsible for obtaining all necessary permits for burning.

3.3 REPLACEMENT OF MATERIALS

A. Paving, Curbing and Miscellaneous Material:
1. Remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing, flagging and minor structures that are over the area to be filled or excavated.
2. Remove and replace bituminous asphaltic and portland cement concrete in accordance with the appropriate sections of these Specifications.
3. Properly store and preserve all material to be replaced in a location approved by the Engineer.

B. Shrubs and Bushes:
1. Remove, store, and replace ornamental shrubs and bushes to be preserved in accordance with accepted horticultural practices.

C. Topsoil:
1. When applicable, carefully remove, store, and protect topsoil in accordance with the appropriate section of this division.

D. Responsibility:
1. Replace, at no additional cost to the Owner, materials lost or damaged because of careless removal or neglectful or wasteful storage, disposal or use of these materials.

END OF SECTION

SECTION 02115

STRIPPING AND STOCKPILING TOPSOIL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Segregate topsoil approved by the Engineer prior to excavation, trenching and grading operations and stockpile it for use in the work.

B. Related Work Specified Elsewhere (When Applicable):
   1. Demolition, clearing, grading, embankment, excavation and landscaping are specified in the appropriate sections in this division.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil shall consist of friable loam of at least two percent decayed organic matter (humus), free of subsoil, and reasonably free of clay lumps, brush, roots, weeds, and other objectionable vegetation, stones and similar objects larger than one (1) inch in any dimension, litter and other materials unsuitable or harmful to plant growth. It shall contain no toxic materials.

B. The quality of the topsoil material to be used shall be subject to approval by the Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Remove topsoil from the areas that are likely to be disturbed as a result of construction operations to a depth based on the soil profile, as approved by the Engineer.

B. Remove topsoil from all designated areas prior to the performance of normal excavation.

3.2 STORAGE

A. Transport topsoil and deposit in storage piles convenient to the areas which are subsequently to receive the application of topsoil.

B. Stockpile topsoil separate from other excavated materials in areas approved by the Engineer.

C. Take all necessary precautions to prevent other excavated material and objectionable material from becoming intermixed with the topsoil before, during and after stripping and stockpiling operations.

D. Neatly trim and grade stockpiles to provide drainage from surfaces and to prevent depressions where water may become impounded.

E. Construct temporary erosion control devices for all stockpiled material, subject to the Engineer's approval.

F. All loam stripped and stockpiled shall be immediately seeded with 70% Domestic/30% Perennial Rye Grass.

END OF SECTION

SECTION 02140

TEMPORARY CONSTRUCTION DEWATERING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Design, furnish, operate, maintain, and remove temporary dewatering system to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction to be performed in the dry; collect and dispose of ground and surface water where necessary to complete the work.

B. Related Work Specified Elsewhere: (When Applicable)
   1. Section 02156 Temporary Excavation Support System
   2. Section 02200 Earthwork

1.2 SUBMITTALS

A. Provide submittals in accordance with Specification Section 01340.

B. Submit design calculations, description and complete scaled and dimensioned layout drawings of the proposed dewatering system, stamped and sealed by a Professional Engineer registered in the State of Maine. Such review shall not relieve the Contractor of sole responsibility for the dewatering system as necessary to prevent damage and settlement to adjacent structures, utilities, streets adjacent to excavations and for the safety of persons working within the excavated areas. Coordinate with Section 02156 Temporary Excavation Support Sytem.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:
   1. Keep work areas dewatered until the structures, pipes, and appurtenances to be built there have been completed to such an extent that they will not be damaged by water.
   2. Thoroughly brace or otherwise protect against flotation all pipelines and structures which are not stable.
   3. Maintain standby backup equipment and power supply throughout the duration of the dewatering operation.
   4. Prevent soil particles from entering the discharge points.
   5. Ground water level shall be maintained at least one foot below the bottom of the excavation.

B. Disposal of Water:
   1. Dispose of water pumped or drained from the construction site in a suitable manner to avoid siltation of adjacent drainage structures and piping, wetlands

or water bodies, injury to public health, damage to public and private property, and damage to the work completed or in progress.

2. Provide suitable temporary channels for water that may flow along or across the construction site.
3. Provide treatment as necessary to prevent discharge of contaminated ground water caused by Contractor's operations, or any contaminated ground water that may pass through the excavation support system selected by the Contractor.
4. Contractor must obtain all necessary regulatory approvals for the disposal of dewatering flows. These may include, among others, approval by the USEPA under the National Pollutant Discharge Elimination System (NPDES) program for construction activities.

C. Damage:
1. Avoid damage to and settlement of adjacent buildings, roads, structures, utilities and other facilities.
2. Any damage to or settlement of structures resulting from the dewatering operations, or the failure of the Contractor to maintain the work in a suitably dry condition shall be repaired by the Contractor at no additional cost to the Owner.

D. Temporary Underdrains:
1. When necessary, temporary underdrains may be placed in excavations.
2. Underdrain pipe shall be perforated corrugated metal, polyethylene or P.V.C. pipe.
3. Entirely surround the underdrain and fill the space between the underdrain and the pipe or structure with free draining material.

E. Excavation Sump Pumping:
1. When necessary and where appropriate to the geotechnical conditions encountered, excavations may be over excavated 6 to 12 inches and filled with screened stone to allow sump pumping of groundwater.
2. The system shall be installed with suitable screens and filters so that pumping of fines does not occur.

F. Well and Wellpoint System:
1. If necessary, dewater the excavations and trenches with an efficient well or wellpoint system to drain the soil and prevent saturated soil from flowing into the excavated wells and area.
2. Wellpoint and well system shall be of the type designed for dewatering work and shall be installed with suitable screens and filters so that pumping of fines does not occur.
3. Pumping units shall be capable of maintaining sufficient suction to handle large volumes of air and water at the same time.

END OF SECTION

SECTION 02156

TEMPORARY EXCAVATION SUPPORT SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: For locations where trench boxes do not provide adequate trench excavation support, design, furnish, install, maintain, and abandon-in-place temporary excavation support system as required to comply with all applicable State and Federal regulations including the Occupational Safety and Health Act. Excavation support system shall consist of steel sheeting, pile and lagging bracing or other systems designed by the Contractor. Related Work Specified Elsewhere (When Applicable):
   1. Section 02140 Temporary Construction Dewatering System
   2. Section 02200 Earthwork

1.2 DESIGN REQUIREMENTS

A. The Contractor shall be responsible for the design and construction of the excavation support structures. The excavation support structures (sheeting systems or other special excavation techniques) shall be properly designed by a Professional Engineer registered in the State in which the project is located, who practices in a discipline applicable to excavation work and has more than 5 years of experience in the design of excavation support systems. The excavation support system shall be designed to accommodate an additional 2 feet of excavation below the bottom of excavation shown on the Contract Drawings.

B. The excavation support system shall be designed and installed to limit the upward hydraulic gradient into the bottom of the excavation and to sustain all existing and expected loads and utilities, to prevent migration of fine-grained materials into the excavation, to prevent all movement to earth which could in any way cause injury to workmen, delay the work or endanger adjacent structures. If detrimental effects result from construction activities, the Contractor shall modify the design, revise construction procedures and/or take measures to mitigate and abate further movement at no cost to the Owner.

C. The Contractor shall prepare an excavation support system monitoring plan intended to monitor the performance of the excavation support system, as well as the adjacent grade and adjacent structures, throughout construction. The excavation support system monitoring plan shall include vibration and deformation monitoring. Contractor shall retain the services of a qualified vibration monitoring consultant to perform vibration monitoring during installation of the excavation support system. Refer to Paragraphs 1.3 and 3.4 for additional requirements.

D. The internal lateral bracing shall be located so that the braces shall not pass through walls and/or slabs of existing or proposed structures.

E. The support system shall provide adequate room to properly perform the installation and to allow for inspection of the installation.

F. Prior to the installation of any portion of the temporary lateral support system, the

Contractor shall furnish to the Owner precondition surveys documenting the existing conditions of the adjacent structures.

G. The use of existing structures to support the sheeting bracing or structural framing shall be prohibited.

1.3 SUBMITTALS

A. Provide submittals in accordance with Specification Section 01340.
B. Submit qualifications of temporary excavation support system design engineer.
C. Submit attached certificate of design and complete scaled and dimensioned layout drawings of the proposed excavation system, stamped and sealed by a Professional Engineer registered in the State in which the project is located. Drawings shall show plan, sections and elevations of the support system as well as the proposed structures. Submittal shall identify:
   1. Physical location on the site and identify any existing utilities, site piping, site electrical conduit that must be relocated prior to excavation support system installation.
   2. Type and location of any surcharge loads adjacent to the excavation support system required by the Contractor to execute the work (e.g., excavators, trucks, cranes, soil piles, etc.).
   3. Design calculations, supporting documentation and materials cut sheets.
   4. Sample monitoring log.
   5. System abandonment requirements.
D. Submit excavation support system monitoring plan, including qualifications of Contractor's vibration monitoring consultant and Contractor's surveyor. The excavation support system monitoring plan shall identify: the specific method, location and frequency of measurements (pre-, during and post-construction); individual(s) responsible for inspection/measurements; submittal and maintenance of on-site records; and threshold vibration values and excavation support system deformation values that, if exceeded, will require immediate stoppage of work and the performance of repairs necessary for reinstatement of a functional system. Provide justification for recommended vibration and deformation tolerances, on a structure-by-structure basis.
E. The Contractor shall have sole responsibility for design, construction, monitoring and abandonment of the excavation support system as necessary to prevent damage to adjacent structures, utilities, streets adjacent to excavations and for safety of persons working within the excavated areas. The submittals will be reviewed for consistency with the design intent.
F. Submittals under this Section shall be provided concurrently with and coordinated with the submittals under Section 02401 (Temporary Dewatering System).

PART 2 - PRODUCTS

2.1 MATERIAL

A. All materials shall conform to all applicable State and Federal regulations including the Occupational Safety and Health Act.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform preparatory work to discover, protect, maintain and restore utilities, foundations or other facilities located in close proximity of the proposed excavation lateral support system.

B. Conduct pre-excavation to remove obstructions along the alignment of the excavation lateral support system which will interfere with installation of the excavation lateral support system.

C. Install the excavation support system, including the installed wall and bracing system, outside the limits of the permanent structure. Construction tolerances (e.g., wall verticality) and lateral wall deflections as a result of excavation and other activities shall be considered in determining the plan location.

D. Excavation shall not proceed more than 2 ft. below the bracing level, anywhere within the excavation support limits, until the entire level of bracing is completely installed.

E. The first level of bracing shall be installed within 5 ft. of the ground surface prior to any excavation below this level.

3.2 INSTALLATION

A. Install excavation support system in accordance with all applicable State and Federal regulations including the Occupational Safety and Health Act. The excavation support system design engineer shall visit the site during excavation support system installation.

3.3 INTERNAL LATERAL WALL BRACING (RAKERS, WALES AND STRUTS)

A. Rakers are only allowed for the temporary lateral brace that is installed within 5 ft. of the ground surface.

B. Use wales, struts, corner braces to provide support of the excavation lateral support walls as required. Include web stiffeners, plates, brackets, or angles as required to prevent rotation, crippling or buckling of connections and points of bearing between structural steel members. Allow for eccentricities due to fabrication and assembly. Consider effects of temperature changes.

C. Install and maintain all support members in continuous tight contact with each other and with the wall being supported.

D. Preload all bracing members (including rakers, corner braces, and struts) in accordance with methods, procedures and sequence as described on the reviewed shop drawings. Coordinate excavation work with installation of bracing and preloading. Use steel shims and steel wedges, welded or bolted in place, to maintain the preloading force in the bracing after release of the jacking equipment pressure. Wood shims or wedges shall not be used. Braces shall be preloaded to 50 percent of the maximum design load. Provide means to control the fluctuation of loading due to temperature variations.

E. Accomplish preloading by jacking struts, rakers, etc. in place against the excavation lateral support system walls, or by other methods acceptable to the Owner or Owner's Representative.

3.4 MONITORING

A. Contractor shall implement the excavation support system monitoring plan intended to monitor the performance of the excavation support system, as well as adjacent grade and adjacent structures, throughout construction. Monitoring shall include the following at a minimum:
   1. Pre-Installation Structure Elevation Survey. Survey prior to excavation support system installation.
   2. Vibration Monitoring. Full-time vibration monitoring during excavation support system installation.
   3. Installation Structure and Support System Surveys.
      a. After excavation support system installation but prior to first brace installation;
      b. When at mid-point of excavation;
      c. When at bottom of excavation;
      d. At weekly intervals during structure construction.
      e. Each survey shall assess the support system deformation and key structures.
   4. No movement of or damage to key structures shall be allowed.

B. The excavation support system design engineer shall visit the site during the monitoring program at periodic intervals.

C. Additionally, if the excavation support system monitoring criteria/requirements are not satisfied due to inadequacy or failure of the excavation support system (settlement of adjacent grade, settlement of structures, cracking of structures, etc.), immediately stop work and perform repairs necessary for reinstatement of a functional system, as well as restoration of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor, at no additional cost to Owner.

3.5 ABANDONMENT-IN-PLACE OF SHEETING

A. Sheeting shall be abandoned-in-place. Contractor shall cut the sheeting or such component at least 4 feet below the ground surface, or as directed by the Engineer.

B. After cutting the sheeting to the proper depth, complete backfilling in accordance with the Specifications.

CERTIFICATE OF DESIGN

RE: Contract between
OWNER: _____
(Name)
and
CONTRACTOR: _____
(Name)
on
CONTRACT: _____
(Title)
_____
(Number) (Date)

The undersigned hereby certify that the engineer listed below:

1. Is licensed or registered to perform professional engineering work in the state of _____(location of Project);

2. Is qualified by education and training to design the _____ _____ specified in Section _____ of subject contract;

3. Has previously designed comparable excavation support systems;

4. Has prepared the design in full compliance with the requirements of subject contract, including all applicable laws, regulations, rules, and codes – including review and coordination with the Dewatering System design; and

5. Will inspect and supervise installation of the excavation support system, will monitor the in-place system to confirm that the system is installed and functions in accordance with the design and will inspect and supervise the removal of the excavation support system.

CONTRACTOR	ENGINEER
By: _____ (Signature)	By: _____ (Signature)
_____ (Name)	_____ (Name)
_____ (Title)	_____ (Engineering Discipline)
_____ (Date)	_____ (Date)

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work described by this Section consists of all earthwork encountered and necessary for construction of the project as indicated in the Contract Documents, and includes but is not limited to the following:
   1. Excavation
   2. Backfilling and Filling
   3. Compaction
   4. Embankment Construction
   5. Grading
   6. Providing soil material as necessary
   7. Disposal of unsuitable materials
   8. Disposal of excess suitable material

B. Related Work Specified Elsewhere: (When Applicable)
   1. Traffic Regulation and Quality Control is specified in Division 1.
   2. Clearing and Grubbing, Temporary Construction Dewatering System, Temporary Excavation Support System, Temporary Erosion Control, Stripping and Stockpiling of Topsoil, Landscaping, and Paving are specified in the appropriate sections of this Division.
   3. Pipe, fittings and valves are specified in Division 2 or 15.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. All work shall be performed and completed in accordance with all local, state and federal regulations.
   2. The General Contractor shall secure all other necessary permits unless otherwise indicated from, and furnish proof of acceptance by, the municipal and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.

B. Line and Grade:
   1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the work.

C. Testing Methods:
   1. Gradation Analysis: Where a gradation is specified the testing shall be in accordance with ASTM C117 and ASTM C136 (or latest revision).
   2. Compaction Control:
      a. Unless otherwise indicated, wherever a percentage of compaction for backfill is indicated or specified, it shall be the in-place density divided by the maximum density and multiplied by 100. The maximum density shall be the density at optimum moisture as determined by ASTM

Standard Methods of Test for Moisture-Density Relations of Soil Using 10-lb. Hammer and 18-in. Drop, Designation D1557 (Modified Proctor), or latest revision, unless otherwise indicated.

b. The in-place density shall be determined in accordance with ASTM Standard Method of Test for Density of Soil in Place by the Sand Cone method, Designation D1556, (or latest revision) or Nuclear method Designation D6938.

c. Wherever specifically indicated, maximum density at optimum moisture may be determined by ASTM Standard Methods of Test for Moisture Density Relations of Soils, ASTM D6938 (Standard Proctor).

d. An Independent Testing Laboratory will be retained by the Owner to conduct all laboratory and field soil sampling and testing, and to observe earth work and foundation construction activities. Laboratory testing will consist of sieve analyses, natural water content determinations, and compaction tests. Field testing will consist of in-place field density tests and determination of water contents.

1.3 SUBMITTALS

A. Collection of samples and testing of all materials for submittals shall be performed by the Independent Testing Laboratory and paid for by the Contractor until the materials are approved by the Owner or Engineer.

B. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.

C. Submit test results (including gradation analysis) and source location for all borrow material to be used at least 10 working days prior to its use on the site. Contractor shall identify and provide access to borrow sites.

D. Submit moisture density curve for each type of soil (on site or borrow material) to be used for embankment construction or fill beneath structures or pavement.

1.4 TESTS

A. The Independent Testing Laboratory shall conform to the following procedures and standards:

B. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.

C. All testing shall be performed by a qualified Independent Testing Laboratory acceptable to the Engineer and Contractor at the Owner's expense unless otherwise indicated (see Section 01400 - Quality Control).

D. Field density tests on embankment materials shall be as follows:

E. Tests shall be taken on every 200 cubic yards of embankment material.

F. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.

G. Trenches: Field density test in trenches shall be taken at 75 linear foot intervals on every third lift.

H. In addition to the above tests the Independent Testing Laboratory will perform additional density tests at locations and times requested by the Engineer.

I. Additional density testing will be required by the Engineer if the Engineer is not satisfied with the apparent results of the Contractor's compaction operation.
   1. If the test results fail to meet the requirements of these specifications, the Contractor shall undertake whatever action is necessary, at no additional cost to the Owner, to obtain the required compaction. The cost of retesting will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount for retesting will be deducted from the Contract Price. No allowance will be considered for delays in the performance of the work.
   2. If the test results pass and meet the requirements of these Specifications, the cost of the testing service will be borne by the Owner, but no allowance will be considered for delays in the performance of the work.

1.5 JOB CONDITIONS

A. Site Information:
   1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn there from by the Contractor. Data are made available for the convenience of Contractor.
   2. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.

B. Existing Utilities and Structures:
   1. The locations of utilities and structures shown on the Drawings are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warranties that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities or structures within the project area.

PART 2 - PRODUCTS

2.1 SOIL MATERIAL

A. Aggregate Base: Shall be screened or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. Type B Aggregate for base shall not contain particles of rock that will not pass the 4 inch square mesh sieve. The gradation of the part that passes a 3-inch sieve shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieves Type B Aggregate
1/2 inch	35-75
1/4 inch	25-60
No. 40	0-25
No. 200	0-5

B. Aggregate Leveling Course and Untreated Surface Course: Shall be screened or crushed gravel consisting of hard durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the material shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
1 inch	95-100
3/4 inch	90-100
No. 4	40-65
No. 10	10-45
No. 200	0-7

C. Blanket Drain Material: Shall be gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. Blanket drain material shall not contain particles of rock which will not pass the 2-inch square mesh. The gradation of the part that passes a 2-inch sieve shall meet the following grading requirements:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
2 inch	100
1/4 inch	25-70
No. 40	0-30
No. 200	0-5

The blanket drain material shall have a permeability of 5x10-3 cm/sec. or faster. Permeability supersedes gradation requirements.

D. Common Borrow: Shall consist of approved material required for the construction of the work where designated. Common borrow shall be free from frozen material, perishable rubbish, peat, organic, and other unsuitable material.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
6-inch	100
No. 200	0-5

E. Common borrow may be used for embankments unless otherwise indicated and provided that the material is at a moisture content suitable for compaction to the specified density. No rocks shall exceed 3/4 of the depth of the specified lift

thickness.

F. Crushed Stone: Shall be a uniform material consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, containing angular pieces, as are those which come from a mechanical crusher. Gradation requirements shall be as follows:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1-1/2 inch	100
1 inch	95-100
1/2 inch	25-60
No. 4	0-10

G. Screened Stone: Shall be a well graded stone consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, meeting the following gradation requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1 inch	100
3/4 inch	90-100
3/8 inch	20-55
No. 4	0-10
No. 8	0-5

2.2 CONCRETE

A. If concrete is required for excess excavation, provide 3,000 psi concrete complying with requirements of Section 03300.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which excavating, backfilling, filling, compaction and grading are to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

A. General:
   1. Excavation consists of removal and disposal of all material encountered when establishing line and grade elevations required for execution of the work.
   2. The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing the

piping; shall furnish and place all sheeting, bracing, and supports; shall do all cofferdamming, pumping, and draining; and shall render the bottom of the excavations firm, dry and acceptable in all respects.

3. All excavation shall be classified as either earth or ledge.
   a. Earth Excavation shall consist of the removal, hauling and disposal of all earth materials encountered during excavation including but not limited to native soil or fill, pavement (bituminous or concrete), existing sewers and manholes, ashes, loam, clay, swamp muck, debris, soft or disintegrated rock or hard pan which can be removed with a backhoe, or a combination of such materials, and boulders that do not meet the definition of "Ledge" below.
   b. Ledge Excavation: Shall consist of the removal, hauling, and disposal of all ledge or rock encountered during excavation. "Ledge" and "rock" shall be defined as any natural compound, natural mixture that in the opinion of the Engineer can be removed from its existing position and state only by drilling and blasting, wedging, sledging, boring or breaking up with power operated tools. No boulder, ledge, slab, or other single piece of excavated material less than two cubic yards in total volume shall be considered to be rock unless, in the opinion of the Engineer it must be removed from its existing position by one of the methods mentioned above.
4. The Contractor shall not have any right of property in any materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling. The Contractor shall dispose of unsuitable and excess material in accordance with the applicable sections of the Contract Documents.

B. Additional Excavation: When excavation has reached required subgrade elevations, notify the Engineer and Resident Project Representative who will observe the conditions.
   1. If material unsuitable for the structure or paved area or pipeline (in the opinion of the Engineer) is found at or below the grade to which excavation would normally be carried in accordance with the Drawings and/or Specifications, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill, screened stone, crushed stone, or concrete as directed by the Engineer.
   2. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations in accordance with all State and local laws and the provisions of the Contract Documents.

C. Unauthorized Excavation: Shall consist of removal of materials beyond indicated subgrade elevations or dimensions without specific authorization of Engineer. Unauthorized excavation, as well as remedial work required by the Engineer shall be at the Contractor's expense. Remedial work required is as follows:
   1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation with select fill or screened stone compacted to 95%. Provide 12"

minimum select fill or screened stone directly under footings. Concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

2. If the bottom of a trench is excavated beyond the limits indicated, backfill the resulting void with thoroughly compacted screened stone, unless otherwise indicated.
3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

D. Trench Excavation: Shall consist of removal, hauling and disposal of all material encountered in the excavation to the widths and depths shown on the Drawings to permit proper installation of underground utilities.

1. Excavate trenches to the uniform width shown on the Drawings sufficiently wide to provide sufficient space for installation, backfilling, and compaction. Every effort should be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
2. Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.
3. Grade bottoms of trenches as indicated for pipe and bedding to establish the indicated slopes and invert elevations, notching under pipe joints to provide solid bearing for the entire body of the pipe, where applicable.
4. If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least two feet above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.
5. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
6. Perform excavation for force mains and water mains in a logical sequence.
7. The extent of open excavation shall be controlled by prevailing conditions subject to any limits prescribed by the Engineer.
8. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards, as outlined in the appropriate section of this Specification.

E. Protection of Persons, Property and Utilities:

1. Barricade open excavations occurring as part of this work and post with warning lights in compliance with local and State regulations.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. Exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures that may be required.
3. Rules and regulations governing the respective utilities shall be observed in execution of all work. Active utilities and structures shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading

operations shall be removed, plugged or capped only with written authorization of the utility owner. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable.

4. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility, the property owner, and the Owner.

F. Use of Explosives:
   1. Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
   2. All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc.

G. Stability of Excavations:
   1. Slope sides of excavations to comply with all codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
   2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

H. Shoring and Bracing:
   1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
   2. Provide trench shoring and bracing to comply with local codes and authorities having jurisdiction. Refer to Specification Section 02156.
   3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Install shoring and bracing as excavation progresses.

I. Material Storage:
   1. Stockpile excavated materials which are satisfactory for use on the work until required for backfill or fill. Place, grade and shape stockpiles for proper drainage and protect with temporary seeding or other acceptable methods to control erosion.
   2. Locate and retain soil materials away from edge of excavations.
   3. Dispose of excess soil material and waste materials as herein specified.

J. Cold Weather Protection:
   1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35*F.
   2. No frozen material shall be used as backfill or fill and no backfill shall be placed on frozen material.

K. Separation of Surface Material:
   1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the work.

2. Prior to excavation, existing pavement shall be cut where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.
3. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
4. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.

L. Dust Control:
1. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. Refer to Specification Section 01562.
2. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, the contractor shall furnish and spread the material, as directed.

3.3 BACKFILL AND FILL

A. General:
1. Backfilling shall consist of replacing material removed to permit installation of structures or utilities, as indicated in the Contract Documents.
2. Filling shall consist of placing material in areas to bring them up to grades indicated on the Drawings.
3. The Contractor shall provide and place all necessary backfill and fill material, in layers to the required grade elevations.
4. Backfill excavations as promptly as work permits, but not until completion of the following:

a. Acceptance by Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
b. Inspection, approval, and recording locations of underground utilities.
c. Removal of concrete formwork.
d. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Temporary sheet piling driven below bottom of structures shall be removed in manner to prevent settlement of the structure or utilities, or cut off and left in place if required.
e. Removal of trash and debris.
f. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
g. Density testing having results meeting requirements specified herein.

5. In general, and unless otherwise indicated, material used for backfill of trenches and excavations around structures shall be suitable excavated material which was removed in the course of making the construction excavation. Unless otherwise specified or allowed by the Engineer the backfill and fill shall be placed in layers not to exceed 8 inches in thickness.
6. All fill and backfill under structures and pavement, and adjacent to structures, shall be compacted crushed stone or select fill as specified or as indicated on

the Drawings. The fill and backfill materials shall be placed in layers not exceeding 8 inches in thickness.

7. All structures (including manholes) shall be placed on a 6-inch mat of screened stone unless otherwise indicated.
8. Suitable excavated material shall meet the following requirements:
   a. Free from large clods, silt lumps or balls of clay.
   b. Free from stones and rock fragments with larger than 12 inch max. dimension.
   c. Free from organics, peat, etc.
   d. Free from frozen material.
9. If sufficient suitable excavated material is not available from the excavations, and where indicated on the Drawings, the backfill material shall be select fill or common borrow, unless otherwise indicated, as required and as directed by the Engineer.
10. Do not backfill with, or on, frozen materials.
11. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.
12. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet.
13. Do not continue backfilling until the previously placed and new materials have dried sufficiently to permit proper compaction.
14. The nature of the backfill materials will govern the methods best suited for their placement and compaction. Compaction methods and required percent compaction is covered in Compaction section.
15. Before compaction, moisten or aerate each layer as necessary to provide a water content necessary to meet the required percentage of maximum dry density for each area classification specified.
16. Do not allow large masses of backfill material to be dropped into the excavation in such a manner that may damage pipes and structures.
17. Place material in a manner that will prevent stones and lumps from becoming nested.
18. Completely fill all voids between stones with fine material.
19. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
20. Deposit backfill and fill material evenly on all sides of structures to avoid unequal soil pressures.
21. Keep stones or rock fragments with a dimension greater than two inches at least one foot away from the pipe or structure during backfilling.
22. Leave sheeting in place when damage is likely to result from its withdrawal.
23. Completely fill voids left by the removal of sheeting with screened stone which is compacted thoroughly.

B. Pipe Bedding, Initial Backfill and Trench Backfill:
   1. Place bedding and backfill in layers of uniform thickness specified herein, and as shown on the Drawings.
   2. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper.

3. Install pipe bedding and initial backfill in layers of uniform thickness not greater than eight (8) inches.
4. Deposit the remainder of the backfill in uniform layers not greater than eight inches.
5. Provide underground utility marking tape for new utility trenches as shown on the Drawings. Refer to Section 02650 – Buried Utility Markings.
6. Where soft silt and clay soils are encountered the trench shall be excavated six inches below the normal bedding and backfilled with 6-inches of compacted sand.
7. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footings.
8. The following schedule lists the bedding materials for various types of pipe. Refer to the pipe trench detail for dimensional requirements.

BEDDING REQUIREMENTS

DI or Concrete Pipe	screened stone or select fill.
PVC or PE Pipe	screened stone.

9. The following schedule lists the initial backfill requirements for various types of pipes. Refer to the pipe trench detail for dimensional requirements.

INITIAL BACKFILL REQUIREMENTS

DI or Concrete, Pipe	Screened stone or select fill
PVC or PE Pipe	Screened stone

10. Special bedding and backfill requirements shown on the Drawings supersede requirements of this section.
11. Where pipes or structures pass through or under the impervious core of the lagoon embankments, bedding and backfill material shall consist of the impervious embankment material. Extra care should be given to properly and thoroughly compact the bedding material around the pipe.

C. Improper Backfill:
1. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.

3. Excavation, backfilling, and compacting work performed to correct improper backfilling shall be performed at no additional cost to the Owner.

D. Ground Surface Preparation:
   1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, scarify or break-up sloped surface steeper than 1 vertical to 4 horizontal.
   2. When existing ground surface has a density less than that specified under "compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

3.4 COMPACTION

A. General:
   1. Control soil compaction during construction to provide not less than the minimum percentage of density specified for each area classification.

B. Percentage of Maximum Density Requirements:
   1. Compact soil to not less than the following percentages of maximum dry density determined in accordance with ASTM D1557 as indicated.
      a. Structures: Compact each layer of backfill or fill material below or adjacent to structures to at least 95% of maximum dry density (ASTM D1557).
      b. Off Traveled Way Areas: Compact each layer of backfill or fill material to at least 90% of maximum dry density (ASTM D1557).
      c. Walkways: Compact each layer of backfill or fill material to at least 93% of maximum dry density (ASTM D1557).
      d. Roadways, Drives and Paved Areas: Compact each layer of fill, subbase material, and base material to at least 95% of maximum dry density (ASTM D1557).
      e. Pipes: Compact bedding material and each layer of backfill to at least 90% maximum dry density (ASTM D1557). Where backfilling with excavated material, compact to native field density.
      f. Embankments: Compact each layer of embankment material to at least 95% of maximum dry density (ASTM D1557).

C. Moisture Control:
   1. Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, in quantities controlled to prevent free water appearing on surface during or subsequent to compaction operations.
   2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
   3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory level.

D. Embankment Compaction:
   1. After each embankment layer has been spread to the required maximum 8-inch thickness and its moisture content has been adjusted as necessary, it shall be

rolled with a sufficient number of passes to obtain the required compaction. One pass is defined as the required number of successive trips which by means of sufficient overlap will ensure complete coverage and uniform compaction of an entire lift. Additional passes shall not be made until the previous pass has been completed.

2. When any section of an embankment sinks or weaves excessively under the roller or under hauling units and other equipment, it will be evident that the required degree of compaction is not being obtained and that a reduction in the moisture content is required. If at any place or time such sinking and weaving produces surface cracks which, in the judgment of the Engineer are of such character, amount, or extent to indicate an unfavorable condition, he will recommend operations on that part of the embankment to be suspended until such time as it shall have become sufficiently stabilized. The ideal condition of the embankment is that attained when the entire embankment below the surface being rolled is so firm and hard as to show only the slightest weaving and deflection as the roller passes.
3. If the moisture content is insufficient to obtain the required compaction, the rolling shall not proceed except with the written approval of the Engineer, and in that event, additional rolling shall be done to obtain the required compaction. If the moisture content is greater than the limit specified, the material of such water content may be removed and stockpiled for later use or the rolling shall be delayed until such time as the material has dried sufficiently so that the moisture content is within the specified limits. No adjustment in price will be made on account of any operation of the Contractor in removing and stockpiling, or in drying the materials or on account of delays occasioned thereby.
4. If because of insufficient overlap, too much or too little water, or other cause attributable to defective work, the compaction obtained over any area is less than that required, the condition shall be remedied, and if additional rollings are ordered, they will be done at no cost to the Owner. If the material itself is unsatisfactory or if additional rolling or other means fails to produce satisfactory results, the area in question shall be removed down to material of satisfactory density and the removal, replacement, and re-rolling shall be done by the Contractor, without additional compensation.
5. Material compaction by hand¬-operated equipment or power-driven tampers shall be spread in layers not more than 6 inches thick. The degree of compaction obtained by these tamping operations shall be equal in every respect to that secured by the rolling operation.

E. Compaction Methods: The Contractor may select any method of compaction that is suitable to compact the material to the required density.

1. General: Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. All voids left by the removal of sheeting shall be completely backfilled with suitable materials and thoroughly compacted.

2. Tamping or Rolling: If the material is to be compacted by tamping or rolling, the material shall be deposited and spread in uniform, parallel layers not exceeding the uncompacted thicknesses specified. Before the next layer is placed, each layer shall be tamped as required so as to obtain a thoroughly compacted mass. Care shall be taken that the material close to the excavation side slopes, as well as in all other portions of the fill area, is thoroughly compacted. When the excavation width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe or structure, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping or rolling, the rate at which backfilling material is deposited shall not exceed that permitted by the facilities for its spreading, leveling, and compacting as furnished by the Contractor.

F. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.5 GRADING:

A. General:
1. Grading shall consist of that work necessary to bring all areas to the final grades.
2. Uniformly grade areas within limits of work requiring grading, including adjacent transition areas.
3. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Compaction:
1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

C. Protection of Graded Areas:
1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

3.6 BASE COURSE AND LEVELING COURSE

A. General:
1. Base course consists of placing the specified materials in layers to support a leveling course or paved surface, as indicated in the Drawings.

B. Grade Control:
1. During construction, maintain lines and grades including crown and cross-slope of base course and leveling course.

C. Placing:
1. Place base course on prepared subbase conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base materials.
2. Place leveling course on prepared base course, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction.

D. Shaping and Compacting:
   1. All layers of aggregate base course and leveling course shall be compacted to the required density immediately after placing. As soon as the compaction of any layer has been completed, the next layer shall be placed.
   2. The Contractor shall bear full responsibility for and make all necessary repairs to the base leveling courses and the subgrade until the full depth of the base leveling courses is placed and compacted. Repairs shall be made at no additional cost to the Owner.
   3. If the top of any layer of the aggregate base or leveling course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.

END OF SECTION

SECTION 02225

FLOWABLE FILL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Provide and install flowable fill material in authorized excavation(s) as shown on the Drawings and/or as specified herein.

B. Related Work Specified Elsewhere:

1. Earthwork, excavation, backfilling, compaction, piping, manholes, testing and pavement are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

A. Perform work in accordance with ACI 229, Controlled Low-Strength Materials, or as specified here-in.

1.3 SUBMITTALS

A. Submit Mix designs for each mixture to be provided at least 15 days prior to production.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Materials shall meet the following requirements:

1. Portland Cement, Type I or II - ASTM C150.
2. Fly Ash (LOI limits do not apply) - ASTM C618.
3. Fine Aggregate/Mineral Filler – ASTM C 33, ASTM or non-ASTM sands or mineral fillers with 100% passing the 1/2" sieve may be considered which produce an acceptable flow and desired performance characteristic. Soils with fine clays will not be considered. All other than ASTM C 33 materials must receive prior approval from the Engineer.
4. Air Entraining Admixtures - As Per Manufacturer's Specifications.
5. Light Weight Cellular Admixture - As Per Manufacturer's Specifications.
6. Water – Potable or ASTM C 94.
7. Preformed Foam – Procedures for evaluation ASTM C 796 and ASTM C 869.

B. Standard Flowable Fill:

1. Compressive strength at 28 days less than 1200 psi

PART 3 - EXECUTION

3.1 EXAMINATION

A. Flowable fill shall be produced and delivered using standard concrete construction equipment and practices.

B. Placing flowable fill shall be by chute, pumping, or other method approved by the Engineer.

C. The flowable fill shall be discharged directly from the mixer truck into the space to

be filled.

D. No flowable fill shall be placed on frozen ground.

E. At the time of placement the flowable fill shall have a temperature of at least 40 degrees F.

F. When flowable fill is placed in freezing temperatures, the material should be covered with blankets and protected from freezing until hardening.

G. The Contractor shall provide all necessary means to confine the material within a designated space.

H. Formed walls or other bulkheads shall be constructed to withstand hydrostatic pressure exerted by flowable fill where necessary and as determined by the Engineer.

I. The Contractor is responsible to ensure underground utilities, including but not limited to pipes, tanks, structures, cables, etc. are secured to prevent floating.

J. No compaction or vibration of the material is required.

K. Where flowable fill is being used as pipe bedding it shall be placed in lifts to ensure lateral support of the pipe develops along the side of the pipe before continuing with the backfilling.

L. When paving over flowable fill in cold weather, any frozen material on the surface shall be scraped off and removed prior to paving.

M. The flowable fill shall be left undisturbed until the material obtains sufficient strength. Sufficient strength for paving is achieved when the flowable fill can support the weight of foot traffic without apparent deformation. Sufficient strength for supporting vehicular traffic is 2.5 tons per square foot as measured by a pocket penetrometer.

N. Trenches shall be covered and barricaded until hardening occurs.

END OF SECTION

SECTION 02270

TEMPORARY EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices, as specified herein, as shown on the Drawings and as directed by the Engineer.
   2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices, or as required to control erosion that occurs during normal construction operations.
   3. Construction operations shall comply with all state and local regulations pertaining to erosion control.
   4. After awarding of or after being awarded the Contract, prior to commencement of construction activities, the Contractor will meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

B. Related Work Specified Elsewhere:
   1. Site work is specified in appropriate sections of this Division.

C. Design Criteria:
   1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
   2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices, as may be necessary, until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material, before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of his responsibility for completion of the work as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Baled Hay:
   1. At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary to hold the bale in place.

B. Sand Bags:
   1. Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.

C. Mulches:

1. Loose hay, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose.
2. Type and use shall be as specified by the "Maine Erosion and Sedimentation Control Best Management Practices" prepared by the Maine DEP, herein after referred to as the BMP.

D. Mats and Nettings:
1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
2. Type and use shall be as specified in the BMP.

E. Permanent Seed:
1. Conservation mix appropriate to the predominant soil conditions as specified in the BMP and subject to approval by the Engineer.

F. Temporary Seeding:
1. Use species appropriate for soil conditions and season as specified in the BMP and subject to approval by the Engineer.

G. Water:
1. The Contractor shall provide water and equipment to control dust, as directed by the Engineer.

H. Silt Fence:
1. Silt Fence shall be one of the commercially available brands, meeting the following requirements:

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM D-4632	124 pounds
Puncture Strength	ASTM D-4833	60 pounds
Apparent Opening Size	ASTM D-4751	#30
Flow Rate	ASTM D-4491	8 gal/min/ft^2

2.2 CONSTRUCTION REQUIREMENTS

A. Temporary Erosion Checks:
1. Temporary erosion checks shall be constructed in ditches and other locations as necessary.
2. Baled hay, sand bags or siltation fence may be used in an arrangement to fit local conditions.

B. Temporary Berms:
1. Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.

C. Temporary Seeding:
1. Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated below:

Season	Seed	Rate
Summer (5/15 - 8/15)	Sudangrass	40 lbs/acre
Late Summer/Early Fall	Oats	80 lbs/acre
(8/15 - 9/15)	Annual Ryegrass	40 lbs/acre
Fall (9/15 - 10/1)	Winter Rye	112 lbs/acre
Winter (10/1 - 4/1	Mulch w/Dormant Seed	80 lbs/acre*
Spring (4/1 - 7/1)	Oats	80 lbs/acre
	Annual Ryegrass	40 lbs/acre

* seed rate only

D. Silt Fence shall be supported by posts and installed per the manufacturer's recommendations.

E. Mulch All Areas Receiving Seeding:
   1. Use either wood cellulose fiber mulch (750 lbs/acre); or straw mulch with chemical tack (as per manufacturer's specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.

F. Erosion control matting for slopes and ditches shall be anchored with pegs and/or staples per manufacturer's recommendations. Contractor shall provide matting along the flowline of all ditches and swales having a longitudinal slope in excess of 0.01 ft/ft, and on all slopes in excess of 3(H) to 1(V).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Temporary Erosion Checks:
   1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
   2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas, as necessary, to inhibit soil erosion.
   3. Siltation fence shall be located and installed as shown on plans or as required to comply with all Federal, State and Local Regulations.
   4. Sedimentation ponds shall be sited and constructed to the grades and dimensions as shown on the Drawings and will include drainage pipe and an emergency spillway.

B. Erosion control matting for slopes and ditches shall be installed where indicated on the Drawings and as required to stabilize the soil until permanent vegetative stabilization is established.

C. Maintenance:
   1. Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor, as appropriate.

D. Removing and Disposing of Materials:
   1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of upon approval by Engineer.
   2. When removed, such devices may be reused in other locations, provided they are in good condition and suitable to perform the erosion control for which they are intended.
   3. When dispersed over adjacent areas, the material shall be scattered to the extent that it causes no unsightly conditions nor creates future maintenance problems.
   4. Sedimentation basins, if no longer required, will be filled in, the pipe removed, the surface loamed and grass cover shall be established.

END OF SECTION

SECTION 02431

CATCH BASINS, GRATES AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Construct catch basins, grates, frames and brick masonry in conformance with the dimensions and locations shown on the Drawings.

B. Related Work Specified Elsewhere: (Where applicable)

1. Pipe, trench excavation and backfill, paving and dewatering are specified in the appropriate Sections in this Division.

1.2 QUALITY ASSURANCE

A. Precast Catch Basin Base, Barrel and Top Sections:

1. Conform to ASTM C478-97 except as modified herein, on the Drawings, or as directed by the Engineer.
2. Minimum strength of 4,000 psi at 28 days
3. Testing:
   a. Determine concrete strength by tests on 6 inch by 12 inch vibrated test cylinders cured in the same manner as the bases, barrels and tops.
   b. Have tests conducted at manufacturer's plant or at an approved testing laboratory.
   c. Have not less than 2 tests made for each 100 vertical feet of precast catch basin sections.

B. Frames and Covers:

1. Acceptable Manufacturers:
   a. EJ Group, Inc.
   b. Neenah Foundry Company
   c. Or equivalent.

C. Masonry:

1. Brick: Shall comply with the ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
2. Cement: ASTM C-150.
3. Hydrated Lime: ASTM C-207.
4. Sand: ASTM C144.

1.3 SUBMITTALS TO THE ENGINEER

A. Submit shop Drawings and manufacturer's literature in conformance with the Standard General Conditions of the Construction Contract.

B. Bases, Barrel Sections and Tops: Submit test results and receive approval from the Engineer prior to delivery to the site.

PART 2 - PRODUCTS

2.1 PRECAST CATCH BASIN SECTIONS

A. Dimensions, as shown on the Drawings.

B. Use flat tops or eccentric cones as appropriate. Exterior face of cone sections shall not flare out beyond the vertical.
C. Joints: Bell-and-spigot or tongue-and-groove formed on machine rings to ensure accurate joint surfaces.
D. Constructed to support an HS-20 wheel loading.
E. Openings:
   1. Provide openings in the risers to receive pipes entering the catch basin of the types and materials approved by the Engineer.
   2. Make openings at the manufacturing plant or cut openings in the field.
   3. Size: To provide a uniform annular space between the outside wall of pipe and the riser.
   4. Location: To permit setting of the entering pipes at the correct elevations.
F. Joints:
   1. Joint gaskets to be flexible self seating butyl rubber joint sealant installed according to manufacturer's recommendations. For cold weather applications, use adhesive with joint sealant as recommended by manufacturer.
   2. Acceptable Materials:
      a. Kent-Seal No. 2
      b. Ram-Nek
      c. Or equivalent.
   3. Joints between precast sections shall conform to related standards and manufacturer's instructions.

2.2 FRAMES AND GRATES

A. All essential details of design shall conform to the Drawings. Standard castings differing in non-essential details may be approved by the Engineer.
B. All frames and grates shall be made of cast iron and shall have machined bearing surfaces to prevent rocking under traffic.
C. Grate castings will be smooth with no sharp edges.
D. Constructed to support an HS-20 wheel loading.

2.3 MASONRY

A. Brick:
   1. Sound, hard, uniformly burned, regular and uniform in shape and size, compact texture, and satisfactory to the Engineer.
   2. Immediately remove rejected brick from the work.
B. Mortar:
   1. Composition (by volume):
      a. 1 part portland cement.
      b. 1/2 part hydrated lime.
      c. 4-1/2 parts sand.
   2. The proportion of cement to lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.
C. Cement:
   1. Shall be Type II portland cement.
D. Hydrated Lime:

1. Shall be Type S.

E. Sand:
   1. Shall consist of inert natural sand.

F. Grading:

Sieve	Percent Passing
No. 4	100
No. 8	95-100
No. 16	70-100
No. 30	40-75
No. 50	10-35
No. 100	2-15
No. 200	0-5

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Precast Catch Basin Sections:
   1. Perform jointing in accordance with manufacturer's recommendations and as approved by the Engineer.
   2. Install barrels and tops level and plumb.
   3. Make all joints water tight.
   4. Solidly fill annular spaces around pipes entering the catch basin with non-shrink grout or other material approved by the Engineer.
   5. Cut openings (as required) carefully to prevent damage to barrel sections and tops. Damaged barrel sections and tops shall be replaced by the Contractor at no additional expense to the Owner.

B. Pipe Connections to Catch Basins: Connect pipes to catch basins with joint design and materials approved by the Engineer.

C. Masonry:
   1. Laying Brick:
      a. Use only clean bricks in brickwork for catch basins.
      b. Moisten the brick by suitable means until they are neither so dry as to absorb water from the mortar or so wet as to be slippery when laid.
      c. Lay each brick in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and thoroughly bond as directed.
      d. Construct all joints in a neat workmanlike manner, construct the brick surfaces inside the manholes so they are smooth with no mortar extending beyond the bricks and no voids in the joints. Maximum mortar joints shall be 1/2 inch.
   2. Curing:
      a. Protect brick masonry from drying too rapidly by using burlaps which are kept moist, or by other approved means.
      b. Protect brick masonry from the weather and frost as required.

D. Frames and Grates:

1. Set all frames in a full bed of mortar, true to grade and concentric with the catch basin opening.
2. Completely fill all voids beneath the bottom flange to make a watertight fit.
3. Place a ring of mortar at least one inch thick around the outside of the bottom flange, extending to the outer edge of the catch basin all around its circumference.
4. Clean the frame seats before setting the covers in place.

E. Bedding and Backfilling:
1. Bedding material of catch basin shall be 6 inches of screened stone (see Section 02200).
2. Backfill 18 inches all around catch basin with gravel borrow.

END OF SECTION

SECTION 02435

CULVERTS AND STORM DRAINS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Provide and install culvert or storm drain pipe and sections of the type(s), size(s) and in the location(s) shown on the Drawings and as specified herein.

B. Related Work Specified Elsewhere:
   1. Excavation and backfill, dewatering, catch basins, pavement, borrow and bedding material are specified in the appropriate sections in this division.

1.2 SUBMITTALS

A. Submit, in duplicate, sworn certificates of inspections and tests performed at the location of manufacturers.

B. Submit shop drawings in accordance with the General Conditions of the Construction Contract.

1.3 DELIVERY, STORAGE AND HANDLING

A. Exercise care when handling pipe to prevent damage of any nature to pipe and finish.

B. Immediately remove damaged materials and replace at no additional cost to the Owner.

C. Store materials above ground on platforms, skids or other adequate supports.

1.4 FIELD QUALITY CONTROL

A. Acceptance will be on the basis of tests of materials and inspection of the complete product.

B. Inspection may be made at the place of manufacture or on the construction site after delivery, or both, and the pipe shall be subject to rejection at any time due to failure to meet all of the specification requirements, even though sample pipe units may have been accepted as satisfactory at the place of manufacture.

C. Immediately remove from the project site all rejected pipe.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe shall be one of the following as specified on the Drawings or at the option of the Contractor and with the approval of the Engineer.
   1. Polyvinyl Chloride (PVC) Pipe
   2. Corrugated Polyethylene (PE) Pipe

B. Materials for pipes shall conform to Standards listed as follows:
   1. PVC (Polyvinylchloride) Pipe. This pipe and fittings shall conform to the requirements of AASHTO M278. All pipe shall be supplied with gasket type joints meeting the requirements of ASTM D3212.

2. Corrugated polyethylene pipe (smooth interior). This pipe and fittings shall have a smooth interior and corrugated exterior and conform to the requirements of AASHTO M252 and AASHTO M294 or ASTM F2648. The pipe joint system shall be watertight (WT) and shall meet or exceed the current ASTM D3212 Lab Test Requirements and the current ASTM F1417 Watertight Field Test Requirements. Coiled pipe will not be accepted.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas to receive piping for the following:
   1. Obstructions that adversely affect the installation and quality of the work.
   2. Deviations beyond allowable tolerances for clearances.

B. Examine pipe and fittings before installation to assure no defective materials are incorporated.

C. Start the work only when conditions are satisfactory.

D. Remove and replace all defective materials at no additional cost to the Owner.

3.2 INSTALLATION

A. Do not install pipe, nor backfill, between December 15 and April 1 without the written permission of the Engineer.

B. Begin laying the pipe at the downstream end.

C. Place metal pipe with the longitudinal laps of seams at the sides and the outside laps of circumferential joints pointing up grade.

D. Lay paved or partially lined pipe with the lining on the bottom.

E. Join flexible pipe sections and metal end sections by coupling bands.

F. Assemble the plates for structural plate arches according to the manufacturer's assembly instructions and as shown on the Drawings.

END OF SECTION

SECTION 02482

TREE PROTECTION AND PRUNING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Work as described by this Section consists of all special excavation required to protect and maintain the existing trees and complete the work as indicated in the Contract Documents, and as specified hereunder:
    a. Protect trees and roots from mechanical damage during construction throughout the project area
    b. Special excavation and tree protection is required at the Main Pump Station site and from STA 1+00 to STA 20+00.
    c. Special Excavation is required in all locations where work occurs underneath the canopy of a tree.
    d. Special Excavation shall consist of hand or vacuum excavation to expose existing tree roots.
    e. Exposed tree roots to be preserved shall be exposed and cut by hand with clean, sterilized equipment by the Project Arborist.
2. Examine all other sections of the Specifications and all Drawings for the relationship of the work under this section and the work of other trades. Cooperate with all trades in performing the work under this section.

B. Related Work Specified Elsewhere:

1. Section 01050 – Coordination
2. Section 01400 - Quality Control
3. Section 02200 – Earthwork
4. Section 02480 - Landscaping
5. Section 02485 – Loaming and Seeding

1.2 QUALITY ASSURANCE

A. All canopy pruning and root pruning shall be completed by the Contractor.
B. No penetration of the tree trunk shall be allowed.
C. Contractor shall provide adequate notification of work within the subject area.

PART 2 - PRODUCTS

2.1 MATERIALS FOR TREE PROTECTION

A. Snow fencing: Snow fencing shall be new four-foot height wooden lath snow fencing, painted red. Stakes for snow fencing shall be six-foot-long stamped metal drive stakes, commonly used to support snow fencing.
B. Primary Tree Protection/Trunk protection
    1. boards shall be 8’ lengths of 2”x4” lumber
    2. strapping shall be 16 gauge galvanized steel wire

C. Signage
   1. A minimum of two signs should be attached to all tree protection areas at no greater than fifty (50') foot intervals. The signs should be a minimum of two (2') feet x two (2') feet, bearing the following phrase in red letters on white background at least four (4") inches in height: TREE PROTECTION ZONE - KEEP OUT!
   2. On a separate portable sign located in the general work area, in red lettering on white background not less than two (2") inches in height is to be the following: PROHIBITED ACTIVITIES: followed by the list below in letters not less than one (1") inch
      a. entry of machinery or people.
      b. storage of building materials.
      c. parking of any kind.
      d. erection or placement of site facilities.
      e. removal or stockpiling of soil or site debris.
      f. disposal of liquid waste including paint and concrete wash.
      g. excavation or trenching of any kind (including irrigation or electrical connections).
      h. attaching any signs or any other objects to the tree.
      i. placement of waste disposal or skip bins.
      j. pruning and removal of branches.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide all equipment necessary for the proper tree protection and pruning.
B. Using colored ribbon, Contractor and Project Arborist shall tag all trees and shrubs within 25 feet of the centerline of the alignment as follows:
   1. Yellow – Trunk and root protection. Root pruning expected
   2. Orange – Trunk and root protection. Root pruning not expected
   3. Red – Tree to be removed.
C. Prior to commencing construction, the Contractor shall stake out the limits of work, including all sidewalk excavation, sidewalk construction, trenching, bridge work, roadway, building construction, and driveway construction.
D. After tagging trees, establishing the tree protection zone and staking out limits of work, but before any work begins, Contractor shall conduct a pre-construction meeting with the Project Arborist and the Engineer. The pre-construction meeting shall be conducted at least two weeks prior to construction to review tree protection procedures and to identify trees and shrubs to be protected or removed.

3.2 TREE PROTECTION

A. Protect trees from stockpiling, material storage including soil, vehicle parking and driving within the tree drip line. Restrict foot traffic to prevent excessive compacting of soil over root systems.
B. Protect root system from flooding, erosion, excessive wetting and drying resulting from de watering and other operations.
C. Above-ground surface runoff shall not be directed into the tree canopy area from

adjacent areas. Ensure that construction does not trap water within the tree drip line.

D. Protect existing plant materials from unnecessary cutting, breaking and skinning of roots and branches, skinning and bruising of bark.

E. When trees are noted to be removed, use air/vacuum excavation of around root structure as needed to protect roots of nearby trees designed for protection/preservation.

F. Primary tree protection shall be provided for each tree within the work area unless the tree is noted to be removed on the plans or its removal is approved by the City of Bath. The work area shall be considered to extend 10 feet beyond the backs of the limit of work as designated on the plans.

G. Secondary tree protection shall consist of snow fencing used to define the work area. Snow fencing shall not obstruct pedestrian or vehicular access to private residences.

H. Primary tree protection shall include 2”x 4” boards in 8-foot lengths vertically strapped around the trunk, at a maximum of 8 inches apart, on center, wrapped with wire, not fasteners.

I. Primary and secondary tree protection shall be installed prior to any construction and shall be maintained during the construction period. The Owner and Contractor or Engineer shall inspect primary and secondary tree protection every other week during the construction period.

J. When trees are noted to be removed, use air excavation as needed to help preserve nearby trees selected for preservation.

K. When trenching, pull material away from the trunk to limit root damage.

L. Signage, as described elsewhere in this section, shall be posted to all secondary tree protection fencing in a way that is visible to all workers.

M. Tree protection shall consist of the following measures:

1. No storage or dumping of any materials or equipment shall be allowed.
2. No parking shall be allowed.
3. No foot traffic or vehicle traffic shall be allowed.
4. Vertical mulching shall be required if soil compaction levels exceeds 75% or more than 3 passes by heavy equipment are expected.
5. If foot or vehicular travel is required within the tree protection area, a layer of at least 12 inches of wood chips, mulch, or other equivalent matting or protection shall be laid down to protect the roots. The matting shall be removed and the area restored to pre-construction conditions upon completion of the work.
6. No soil sterilants shall be used adjacent to preserved trees.

3.3 PRUNING

A. Selective pruning of branches that would interfere with construction may be conducted only after approval by the Owner.

B. Pruning of roots shall be conducted only with sharp, sterilized hand pruning instruments. Do not break, chop, or mutilate.

C. No roots greater than 1.5 inches shall be cut other than by the City.

D. All roots shall be cut cleanly with hand pruners or hand saw to promote regrowth.

3.4 TREE SURGERY

A. All trees overhanging the back of the sidewalk or within the public right-of-way line shall be pruned in accordance with ANSI A300 standards for pruning. Trees shall be trimmed and limbed to provide the following equipment clearances within the work zone, except where overhead lines are present that would make it impossible for equipment to damage the trees:
   1. 33 feet over the roadway (from face of curb to face of curb)
   2. 14 to 16 feet from the face of curb to the back of the sidewalk (which is approximately co-located with the right-of-way line).

B. Existing trees shall be trimmed of all dead, diseased, and obviously weak limbs at the direction of the City of Bath. The presence of any disease condition, fungus fruit bodies, decayed trunk or branches, split crotches or branches, cracks, or other structural weaknesses should be reported in writing to the Engineer and corrective measures recommended.

C. All cuts shall be made as close as possible to the trunk or parent limb, without cutting onto the branch collar or leaving a protruding stub. Bark at the edge of all pruning cuts should remain firmly attached.

D. All branches too large to support with one hand shall be precut to avoid splitting or tearing of the bark. Where necessary, ropes or other equipment should be used to lower large branches or stubs to the ground.

E. Equipment that will damage the bark and the cambium layer shall not be used on or in the tree. The use of pruning spurs is not permitted for pruning operations on live trees.

F. Sharp tools shall be used so that clean cuts will be made at all times.

G. All cut limbs shall be removed from the crown upon completion of the pruning.

3.5 EXCAVATION AROUND TREES

A. Limits of Special Excavation area as indicated above.

3.6 FINISH GRADING

A. Maintain existing grades within drip line of trees unless otherwise indicated.

B. Soil Preparation: If soil within drip line of trees is compacted, then prior to watering or fertilizing trees, area within the drip lines shall be tilled to break up the top two inches of existing soil.

3.7 CLEAN-UP

A. Upon completion of work under this section all excess stones, debris, and soil resulting from work under this section, which have not previously been cleaned up, shall be removed from the project site. Material generated during any of the activities described herein shall be removed from the site at the end of each working day as directed by the Engineer. The Contractor shall repair any damage to site or structures to restore them to original condition, as directed by the Engineer, at no cost to the Owner.

3.8 PUBLIC HEALTH AND SAFETY

A. Upon encountering any condition of tree work or tree health which might threaten the public health, safety, and welfare and which is not directly addressed by this

specification section, the arborists and the Contractor shall notify the Engineer immediately and shall make recommendations pertaining to the resolution of said conditions.

3.9 LIABILITY

A. The Contractor shall be responsible for the protection of all existing trees and plants, unless specified for removal on the Drawings or designated for removal in the field by the City of Bath, for the length of the construction period, including liability for all damages as specified herein. The placement of additional protection devices beyond those specified herein shall be at the Contractor's discretion.

END OF SECTION

SECTION 02485

LOAMING & SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.

B. Related Work Specified Elsewhere (When Applicable): Earthwork, excavation, backfill, compaction, site grading and temporary erosion control are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS AND TESTING

A. Seed:

1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
2. This certification shall appear in, or with, all copies of invoices for the seed.
3. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
4. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.

B. Topsoil:

1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
3. Have soil samples tested by an independent soils testing laboratory, approved by the Engineer, at the Contractor's expense.
4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing.
5. Approval, by the Engineer, to use topsoil for the work will be dependent upon the results of the soils tests.

C. Lime & Fertilizer:

1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.

2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.
3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE & HANDLING

A. Seed:
   1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
   2. Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.

B. Fertilizer:
   1. Furnish all fertilizer in unopened original containers.
   2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading.

B. Seeding:
   1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
   2. Weather Conditions:
      a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
      b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
      c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed:
   1. Provide the grass seed mixture approved by the Engineer, having the following composition:
      a. Park Mixture:
         i. 50 percent Creeping Red Fescue
         ii. 30 percent Kentucky Bluegrass

iii. 20 percent Annual Ryegrass
iv. Add 1 pound White or Dutch Clover per acre
v. No weed seeds allowed

b. Roadside Mixture:
i. 50 percent Creeping Red Fescue
ii. 15 percent Kentucky Bluegrass
iii. 5 percent White Clover
iv. 2 percent Red Top
v. 3 percent Birdsfoot Trefoil
vi. 25 percent Annual Ryegrass
vii. Add 1 pound of White or Dutch Clover per acre
viii. No weed seeds allowed

c. Lawn Areas:

i.	Kentucky 31 Fescue	25 percent
ii.	Chewing Fescue	15 percent
iii.	Creeping Red Fescue	15 percent
iv.	Pennfine Perennial Rye	25 percent
v.	Lynn Perennial Rye	10 percent
vi.	Common Annual Rye	10 percent
vii.	No weed seeds allowed	

2. Do not use seed which has become wet, moldy, or otherwise damaged in transit or during storage.

B. Topsoil:
1. Fertile, friable, natural topsoil typical of the locality, without admixture of subsoil, refuse or other foreign materials and obtained from a well-drained site. Mixture of sand, silt, and clay particles in equal proportions.
2. Free of stumps, roots, heavy of stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, weeds, sticks, brush or other deleterious matter.
3. Not less than 4 percent nor more than 20 percent organic matter.
4. Topsoil depth shall be 4-inches, unless otherwise indicated.

C. Lime:
1. Provide lime which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. l00 sieve.
2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. l00 sieve. No additional payment will be made to the Contractor for the increased quantity.

D. Fertilizer:
1. Provide a commercial fertilizer approved by the Engineer.
2. Provide fertilizer containing the following minimum percentage of nutrients by weight:
l0% Available phosphoric acid
l0% Available potash
l0% Available nitrogen (75% of the nitrogen shall be organic)

PART 3 - EXECUTION

3.1 PREPARATION

A. Equipment:
   1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
   2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.

B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.
   1. Scarify the subgrade to a depth of 2 inches to allow the bonding of the topsoil with the subsoil.
   2. Apply topsoil to a depth of 4 inches or as directed on areas to be seeded.
   3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
   4. Remove all objectionable material and form a finely pulverized seed bed.

3.2 PERFORMANCE

A. Grading:
   1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.
   2. Leave all surfaces in even and properly compacted condition.
   3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.

B. Placing Topsoil:
   1. Uniformly distribute and evenly spread topsoil on the designated areas.
   2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
   3. Correct any irregularities in the surface resulting from topsoiling or other operations to prevent the formation of depressions where water may stand.
   4. Thoroughly till the topsoil to a depth of at least 3 inches by plowing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer. The surface shall be cleared of all debris and or stones one inch or more in diameter.

C. Placing Fertilizer:
   1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
   2. Incorporate fertilizer into the soil to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
   3. The incorporation of fertilizer may be a part of the tillage operation specified above.
   4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.

D. Placing Lime:
   1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.
   2. Distribute lime at a rate determined from the pH test, to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.

E. Seeding:
   1. Fine rake and level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
   2. Hydroseeding:
      a. Hydroseeding may be performed where approved and with equipment approved by the Engineer.
      b. Sow the seed over designated areas at a minimum rate of 5 pounds per 1000 square feet.
      c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydroseeder.
      d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.
   3. Drill Seeding:
      a. Drill seeding may be performed with approved equipment having drills not more than 2 inches apart.
      b. Sow the seed uniformly over the designated areas to a depth of l/2 inch and at a rate of 5 pounds per l,000 square feet.
   4. Broadcast Seeding:
      a. Broadcast seeding may be performed by equipment approved by the Engineer.
      b. Sow the seed uniformly over the designated areas at a rate of 5 pounds per l,000 square feet.
      c. Sow half the seed with the equipment moving in one direction and the remainder of the seed with the equipment moving at right angles to the first sowing.
      d. Cover the seed to an average depth of l/2 inch by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices.
      e. Do not perform broadcast seeding work during windy weather.

F. Compacting:
   1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
   2. Compact the entire area immediately after the seeding operations have been completed.
   3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
   4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
   5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.

G. Mulching for Permanent Seeding:

1. Apply mulch at the specified rate for the given type and as specified by the "Maine Erosion and Sedimentation Control Best Management Practices" prepared by the Maine DEP.
2. Erosion Control Mix must contain some soil.
3. Hydraulic mulches, such as paper mulch and cellulose fiber, can include seeds, fertilizer, or soil binders.

Maine	
Mulch Type	**Rate**
Straw	2 bales (70-90lbs)/1,000 SF
Erosion Control Mix	<3:1 Slope: 2 inches min. >3:1 Slope: 4 inches min.
Paper Mulch	5 lbs/1,000 SF
Cellulose Fiber	40 lbs/1,000 SF
Erosion Control Blankets	Per manufacturer's instructions
Wood Chips and Bark Mulch	3 inches min.

3.3 PROTECTION & MAINTENANCE

A. Protection:
   1. Protect the seeded area against traffic or other use.
   2. Erect barricades and place warning signs as needed.

B. Maintenance:
   1. At the time of the first cutting, set mower blades two inches high. All lawns shall receive at least two mowings before acceptance. Coordinate schedule for mowing with Engineer.
   2. Maintenance shall also include all temporary protection fences, barriers and signs and all other work incidental to proper maintenance.
   3. Maintain grass areas until a full stand of grass is indicated, which will be a minimum of 45 days after all seeding work is completed, and shall not necessarily related to Substantial Completion of the General Contract.
   4. Protection and maintenance of grass areas shall consist of watering, weeding, cutting, repair of any erosion and reseeding as necessary to establish a uniform stand for the specified grasses, and shall continue until Acceptance by the Engineer of the work of this section. It shall also include the furnishing and applying of such pesticides as are necessary to keep grass areas free of insects and disease. All pesticides shall be approved by Engineer prior to use.

3.4 ACCEPTANCE

A. At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

END OF SECTION

SECTION 02510

CEMENT CONCRETE SIDEWALKS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: This work shall consist of the construction of new cement concrete sidewalks and driveways in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the Engineer.

B. Related Work Specified Elsewhere: (When Applicable) Earthwork, aggregate base and subbase, bituminous concrete paving and granite curbs are specified in the appropriate sections in this Division.

1.2 RELATED DOCUMENTS

A. State of Maine Department of Transportation Standard Specifications for Highways and Bridges, latest edition, herein after referred to as MDOT Specifications.

1.3 QUALITY ASSURANCE

A. Materials: Use only materials furnished by a bulk cement concrete producer regularly engaged in the production of portland cement concrete.

B. Submittals: A certificate of compliance shall be furnished to the Engineer that the materials supplied comply with the specification requirements.

1.4 SUBMITTALS

A. Refer to 03300 – Cast in Place Concrete for required material submittals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The portland cement concrete shall conform to the requirements of AASHTO M85 Type II with a moderate heat of hydration and with the following exceptions:

1. The autoclave expansion shall be limited to a maximum of 0.20 percent.
2. There will be no requirements for tensile strength.

Only one brand of cement shall be used on any one contract unless otherwise permitted, in writing, be the Engineer.

B. The welded wire fabric for reinforcement shall conform to the requirements of AASHTO M 55/M 55, unless otherwise specified.

C. The premolded expansion joint material shall be non-extruding and resilient bituminous type and shall conform to the requirements of AASHTO M213.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation shall be to the depth and width that will permit the installation and bracing

of the forms. The foundation shall be shaped and compacted to a firm even surface conforming to the section shown on the plan. All soft and yielding material shall be removed and replaced with acceptable material.

3.2 FORMS

A. Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be true, free from warp and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.

3.3 PLACING CONCRETE

A. The foundation shall be thoroughly moistened immediately prior to placing the concrete. The proportioning, mixing and placing of the concrete shall be in accordance with good construction practices, as stated in the requirements of the MDOT specifications Section 502 - Structural Concrete.

3.4 FINISHING

A. The surface shall be finished to produce a broom like pattern.
B. No plastering of the surface with mortar will be permitted.

3.5 JOINTS

A. Joints shall be located as shown on the plans. Slabs shall be placed alternately and the joints coated with an approved bituminous material before placing the adjacent slab.
B. When a concrete sidewalk is constructed adjacent to a curb, building, retaining wall, light pole base or other fixed structure, a 1/4 inch thick premolded joint filler shall be used between the slab and the structure.

3.6 CURING

A. Concrete shall be cured for at least 72 hours. Curing shall be by moist burlap or mats, white pigmented curing compound or by other approved methods. During the curing period, all traffic, both pedestrian and vehicular, shall be excluded. Vehicular traffic shall be excluded for such additional time as may be directed.

END OF SECTION

SECTION 02513A

BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Furnish all plant, labor, equipment and materials required to install bituminous concrete pavement courses, including sidewalks, driveways, temporary and permanent trench paving and restoration of pavement markings as shown on the Drawings and as specified herein.
   2. Remove bituminous asphaltic and/or Portland cement pavement, and replace bituminous asphaltic pavement, base, binder courses and surface courses, including temporary pavement, within the area(s) shown on the Drawings and as directed by the Engineer.
   3. Keep pavement removal to a minimum width suitable for the required construction.
   4. Apply pavement markings to the permanent paving as specified.

B. Work Not Included: Removal and replacement of paving for the convenience of the Contractor will not be considered for payment.

C. Related Work Specified Elsewhere (When Applicable):
   1. Excavation, backfill, aggregate base and subbase.

1.2 QUALITY ASSURANCE

A. Materials: Use only materials furnished by a bulk bituminous concrete producer regularly engaged in the production of hot mixed, hot laid bituminous concrete.

B. Equipment: Provide, maintain and operate pavers, dump trucks, tandem, 3-wheel and pneumatic tired rollers well suited to the mixtures being placed. Provide, maintain and operate hand equipment as required. When applicable, provide, maintain and operate trimming equipment and materials.

C. Mix Requirements, Method of Placement and Compaction: All mixes shall conform to the State of Maine Department of Transportation's SUPERPAVE mix standards.

1.3 SUBMITTALS

A. A Job Mix Formula approved by the State of Maine Department of Transportation's Central Laboratory in Bangor shall be submitted for each mixture to be supplied at least 15 calendar days prior to production.

B. Delivery slips shall be furnished with each load of mix delivered to the project. Information shall include:
   1. Vehicle identification.
   2. Date.
   3. Project.
   4. Identification of material.
   5. Gross, tare and net weights.
   6. Signed by the bituminous concrete producer.

7. Stamped by a licensed public weighmaster.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hot Bituminous Paving Mix:
   1. Binder Course - Maine D.O.T. Type 19.0 mm Superpave Mix
   2. Surface Course - Maine D.O.T. Type 12.5 mm Superpave Mix
   3. Sidewalks and Drives - Maine D.O.T. Type 9.5 mm Superpave Mix
   4. Deep Lifts in Full Construction - Maine D.O.T. Type 25.0 Superpave Mix.

B. Composition of Mixtures - Control Points

SIEVE SIZE	GRADING			
	TYPE 25 mm	TYPE 19 mm	TYPE 12.5 mm	TYPE 9.5 mm
	PERCENT BY WEIGHT PASSING - COMBINED AGGREGATE			
37.5 mm	100			
25 mm	90-100	100		
19 mm	-90	90-100	100	
12.5 mm	-	-90	90-100	100
9.5 mm	-	-	-90	90-100
4.75 mm	-	-	-	-90
2.36 mm	15-41	23-49	28-58	32-67
1.18 mm	-	-	-	-
0.60 mm	-	-	-	-
0.30 mm	-	-	-	-
0.075 mm	1-7	2-8	2-10	2-10

C. Tack Coat:
   1. Emulsified type, Grade RS-1, CRS-1, HFMS-1, CSS-1, 1h

D. Pavement markings shall be in accordance with Section 02577.

PART 3 - EXECUTION

3.1 GENERAL

A. Grade Control:
   1. The Contractor shall establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.

B. Trench areas shall receive initial paving as the work progresses where trenches are in paved streets. Not more than 300 linear feet of backfill trench shall be left unpaved.

C. Reset all existing manholes to finished grade as required at no additional cost to the Owner.

3.2 PAVEMENT REMOVAL

A. General:

1. Exercise extreme care in the removal of pavement so that pavement will not be unnecessarily disturbed or destroyed.
2. Mechanically cut pavement to be removed to a straight line, unless otherwise directed by the Engineer.
3. All pavement removed shall become the property of the Contractor and disposed of at locations acceptable to or designated by the Owner at no additional cost to the Owner.

B. Maine DOT Areas:
1. When removing pavement under the jurisdiction of the Maine DOT, strictly adhere to all DOT regulations controlling pavement openings.

3.3 SURFACE PREPARATION

A. Tack coats shall conform to Section 410 of the Maine D.O.T. Standard Specifications.

B. Tack Coat:
1. Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.05 to 0.15 gallons per square yard of surface.

3.4 WEATHER AND SEASONAL LIMITATIONS

A. The State is divided into 2 paving zones as follows:
1. Zone 1 - Areas north of US Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais.
2. Zone 2 - Areas south of Zone 1 including the US Route 2 and Route 9 boundaries.

B. The Contractor may place Hot Mix Asphalt Pavement for use other than a traveled way wearing course in either Zone between the dates of April 15th and November 15th, provided that the air temperature as determined by an approved thermometer (placed in the shade at the paving location) is 2°C or higher and the area to be paved is not frozen. The Contractor may place Hot Mix Asphalt Pavement as traveled way wearing course in Zone 1 between the dates of May 1st and the Saturday following October 1st and in Zone 2 between the dates of April 15th and the Saturday following October 15th, provided the air temperature determined as above is 10°C or higher. For the purpose of this Subsection, the traveled way includes truck lanes, ramps, approach roads and auxiliary lanes.

C. Hot Mix Asphalt Pavement used for curb, driveways, sidewalks, islands, or other incidentals is not subject to seasonal limitations, except that conditions shall be satisfactory for proper handling and finishing of the mixture. Unless otherwise specified, the Contractor shall not place Hot Mix Asphalt Pavement on a wet or frozen surface, and the air temperature shall be 2°C or higher.

3.5 PLACING THE MIX

A. General:
1. Place asphalt concrete mixture on prepared surface. Minimum allowable temperature for placing is 250°F. Maximum shall be 325°F. Place in areas inaccessible to paving machine and small areas by hand. Place each course to required grade, cross-slope and compacted thickness.

B. Protection:
   1. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened to the extent that the pavement will not be damaged.

3.6 PAVEMENT MARKINGS

A. Material, approved by the Engineer, is to be furnished and applied after the installation of permanent paving.

B. Apply pavement markings in accordance with existing markings. Match paint color, marking dimensions, layout and other details with existing markings in the vicinity of the project.

END OF SECTION

SECTION 02525

GRANITE CURBS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: This work shall consist of furnishing and installing curb or edging, or removing and relaying existing curbing or edging in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the Engineer. The types of curbs are designated as follows:
   Type 1 - Vertical granite curb
   Type 5 - Sloped granite edging

B. Related Work Specified Elsewhere: Excavation and Embankment, Aggregate Base and Subbase, Bituminous Concrete Paving and Landscaping are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS

A. Submit shop drawings in accordance with the applicable sections of Division 1, and the General Conditions of the Specifications.
B. Provide dimensional information, layout diagrams, and source of materials.
C. Submit mortar mix design.
D. Submit masonry contractor's qualifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:
   1. The stone for curbing and edging shall be hard, durable, quarried granite.
   2. It shall be gray in color, free from seams, cracks or other structural defects and shall be of smooth splitting character.
   3. The curb may contain natural color variations that are characteristic of the granite source.
   4. The dimensions, shape and other details shall be as shown on the Drawings.

B. Source:
   1. The Contractor shall submit for approval the name of the quarry which is the proposed source of the granite for curb materials.
   2. Samples shall be submitted for acceptance by the Engineer when requested.

C. Finish and Surface Dimensions:
   1. Vertical Curb, Type 1:
      a. The individual curb stones shall conform to the dimensions indicated on the Drawings.
      b. Individual stones shall be furnished in minimum lengths of 6 feet, unless otherwise specified.

c. The exposed face of the stone curb shall be free from indications of drill holes. Half drill holes not larger than 3/4 inches diameter will be permitted in the arris line in the plane of the back.
d. The top surface shall be sawed or dressed to an approximately true plane with no depression or projection on that surface of over 1/8 inch.
e. The top front arris line shall be pitched straight and true with no variations from a straight line greater than 1/4 inch.
f. The top back arris line shall meet the same requirement as the top front arris except that indentations of a maximum of 3/8 inch will be allowed.
g. There shall be no projection or depression on the back face which would exceed a batter of 1 horizontal on 3 vertical for a distance from the top of 3 inches.
h. The front face shall be at right angles to the top and shall be smooth split and have no projections greater than one inch or depressions greater than 1/2 inches, measured from the vertical plane of the face through the top arris line, for a distance down from the top of 8 inches. The remainder of the face shall have no projections or depressions greater than one inch measured in the same manner.
i. The ends of the curb shall be approximately square with the planes of the top, back and face and so finished that when the sections are placed end to end with the required minimum spacing of 1/4 inch no more than 5/8 inch space shall show in the joint for the full width of the top surface and for the entire exposed front face. The remainder of the end may extend back no more than 8 inches from the plane of the joint.
j. The bottom surface may be sawn or split.
k. Drill holes through the curb will be allowed providing they are at least 9 inches below the top and are mortared full with portland cement mortar before placing the stone.

2. When curbing is specified on the Drawings with a radius of 60 feet or less, it shall be cut on the specified radius.
3. Curb Inlets: Inlets used at catch basins shall conform to the applicable requirements of Vertical Curb, Type 1, and to the shape, dimensions and details as shown on the Drawings.
4. Sloped Edging, Type 5:
   a. The individual edging stones shall conform to the dimensions indicated on the Drawings.
   b. Individual stones shall be furnished in minimum lengths of two (2) feet, unless otherwise specified.
   c. The exposed face shall be smooth split to an approximate true plane having no projections or depressions which will allow over one (1) inch to show between a two (2) foot straightedge and the face when the straightedge is placed as closely as possible on any part of the face.
   d. Half drill holes not more than three (3) inches in length and 3/4 inch in diameter will be permitted along the bottom.
   e. The arris line, top front shall be straight and true with no variation from a straight line greater than 1/8 inch.

f. The arris lines at the bottom of the face shall be straight and true so that not over one (1) inch shall show between the stone and a straightedge for the full length of the stone.

g. The ends shall be square to the length at the face and so finished that when the stones are placed end to end, no space more than 1 1/2 inches will show in the joint for the width of the face.

h. When sloped edging is specified on the Drawings with a radius of thirty (30) feet or less, it shall be cut on the specified radius.

5. Terminal curb, Type 1: Shall meet the requirements of Vertical Curb, Type 1 as contained herein.

D. Joint Mortar:

1. Shall consist of one (1) part portland cement and two (2) parts sand and mixed with sufficient water to form a plastic composition.
2. The portland cement shall conform to AASHTO M85, Type II-A.
3. The sand shall consist of the following gradation:

100%	Passing the No. 8 sieve
15-40%	Passing the No. 50 sieve
0-10%	Passing the No. 100 sieve
0-5%	Passing the No. 200 sieve

PART 3 - EXECUTION

3.1 REMOVAL OF CURBING

A. The Contractor shall carefully remove, store and clean curb specified on the Drawings or designated for resetting.

B. Curbing damaged or destroyed, as a result of the Contractor's operations or because of his failure to store and protect it in a manner that would prevent loss or damage, shall be replaced with curbing of equal quality at the Contractor's expense.

3.2 EXCAVATION

A. Excavation shall be made to the required depth and base material upon which the curb is to be set shall be compacted to a firm, even surface.

B. All soft and unsuitable material shall be removed and replaced with suitable material which shall be thoroughly compacted.

3.3 INSTALLATION

A. The curb and sloped edging shall be set so that the front top arris line is in close conformity to the line and grade required.

B. All space beneath the curbing shall be filled and thoroughly tamped with material meeting the requirements of the bed course material.

3.4 JOINTS

A. The required spacing between stones shall be a minimum of 1/4 inch and a maximum of 5/8 inch for Type 1 curb.

B. The required spacing between stones shall be a maximum of 1/2 inch for Type 5 curb.

C. Joints between stones shall be carefully filled with mortar along the back portion of the joint to prevent loss of backfill material.

3.5 BACKFILLING

A. After the joints have set, any remaining excavated areas shall be filled and tamped with approved material placed in eight (8) inch layers.

3.6 CURB INLETS

A. Curb placed adjacent to curb inlets shall be installed with steel dowels cemented into each stone with epoxy grout.

END OF SECTION

SECTION 02526B

SLIPFORMED CONCRETE CURBS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: This work shall consist of furnishing and installing curb in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the Engineer. The types of curbs are designated as follows:
   1. Straight Curb
   2. Radius Curb
   3. Terminal Curb

B. Related Work Specified Elsewhere: Excavation and Embankment, Aggregate Base and Subbase, Bituminous Concrete Paving and Landscaping are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS

A. Submit Concrete Mix designs including past field performance test results.

B. Submit product data for bonding agent.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The portland cement concrete shall conform to the requirements of AASHTO M85 Type II with a moderate heat of hydration and with the following exceptions:
   1. The autoclave expansion shall be limited to a maximum of 0.20 percent.
   2. There will be no requirements for tensile strength.
      Only one brand of cement shall be used on any one contract unless otherwise permitted, in writing, be the Engineer.
   3. Coarse aggregate for concrete shall meet the requirements of MaineDOT Section 703.02 for Class “A” or “AA”.
   4. Minimum strength of concrete: 4,000 psi.

B. Fiber reinforcement shall meet the requirements of ASTM C-1116, Section 4.1.3 and AC-32 at 0.75 lb per CY.

C. The premolded expansion joint material shall be non-extruding and resilient bituminous type and shall conform to the requirements of AASHTO M213.

D. Curing Compound shall be a clear emulsion meeting the requirements of ASTM C-309 Type 1 or 1D, Class A&B and AASHTO M-148.

E. Bonding agent for the concrete and the pavement base shall be a chemical concrete bonding agent meeting the tensile bond strength testing requirements of ASTM C-932

PART 3 - EXECUTION

3.1 LAYOUT CURB

A. The Contractor shall layout the edge of curb line on the base pavement as a guide for the slipform operation.

3.2 BONDING

A. Sweep surface of pavement where curbing shall be placed.
B. Apply bonding agent to pavement in curbing locations.

3.3 INSTALLATION

A. The slip form paving operation of depositing, spreading, consolidating and finishing shall be such that, insofar as possible, continuous operation of the paver will be maintained. Starting and stopping of the paver should be kept to a minimum. The concrete shall be vibrated, either externally or internally, with sufficient intensity to consolidate it throughout its entire width and depth. Whenever, for any reason, it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped immediately, and not restarted until the forward motion of the paver resumes.
B. Curing compound shall be applied shortly after the installation of the curbing.
C. For cold weather slipforming the outside temperature must be at least 36º F and rising.

3.4 JOINTS

A. Expansion joints shall be placed at the end of all radii and against buildings or other fixed objects, and in no case shall the distance between expansion joints exceed 160 feet.
B. Contraction joints shall be saw cut 1” -3” into the curbing at 10-foot intervals along the length of the curb. If the curb is adjacent to a sidewalk the contraction joints in the sidewalk shall be in the same locations as the curbing and made to match.

3.5 PROTECTION

A. Slipform curbing must be adequately protected after placement. The concrete shall be allowed to cure for at least 72 hours. During cold weather conditions, when temperatures drop below the required 36º F after placement, curbing shall be protected by concrete blankets of a combination of plastic sheeting and straw. After any placement of slipform curbing, regardless of weather conditions, the placed curbing shall be protected by traffic control devices and flagging as necessary for a period of 7 days.
B. Curbing damaged or destroyed, as a result of the Contractor's operations or because of his failure to protect it in a manner that would prevent loss or damage, shall be replaced with curbing of equal quality at the Contractor's expense.

3.5 BACKFILLING

After the concrete has been in place for 7 days, any remaining excavated areas shall be filled and tamped with approved material.

END OF SECTION

SECTION 02577

PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. This work shall consist of providing final reflective pavement lines and markings during paving operations as shown on the plans. It shall consist of providing temporary pavement markings during construction.

1.2 SUBMITTALS

A. All submittals shall be in accordance with 01340 – Submittals, and the General Conditions of the Construction Contract.

B. Submit product data for all pavement marking materials.

PART 2 - PRODUCTS

2.1 MATERIALS - TAPE

A. Performed Plastic:

1. General - Reflectorized pavement marking tape and marking sheeting, performed into rolls or ribbons of various lengths, pliability, and widths suitable for use as reflective markings on Portland cement concrete or bituminous pavement shall consist of a mixture of high-quality polymeric materials, pigments, or glass beads that are uniformly distributed throughout, with a reflective layer of beads bonded to the top. The edges of the performed material shall be clean cut and true. It may be supplied with a precoated, factory applied adhesive for immediate pavement application without the use of heat, solvent or other types of adhesive operations, or it may be furnished with separate adhesives as recommended by the manufacturer. The affixed material shall be capable of molding itself to the pavement contoured by the action of traffic and maintain its original dimensions and placement under normal traffic conditions at the pavement temperatures, which could occur within Maine.
2. Physical Requirements - Color Pigments shall be selected and blended to conform to standard highway colors throughout the expected life of the material. When tested by Federal Test Method Standard 141 Method 4232, the white shall be no darker than Color Number 37778 of Federal Standard number 595 and the yellow shall conform to Color Number 33538 of Federal Standard Number 595 (Highway yellow Color PR#1).
3. Retro-Reflectivity - The retro-reflective performed film shall have a layer of reflective spheres bonded to the top surface. The white and yellow film shall have the following initial minimum retroreflectance values at 0.2° and 0.5° observation angles and 86° entrance angle as measured in accordance with the photometric testing procedures of ASTM D4061. Retroreflectance values shall

be expressed as specific luminance in millicandelas per square meter per lux (medm 2lx 1) [millicandelas per square foot/foot candle (med ft 2fc 1)]

	White		Yellow	
Observation Angle	0.2°	0.5°	0.2°	0.5°
SL[medm ^{2}lx ^{1}] [med ft ^{2}fc ^{1}]	550	380	410	250

The test distance shall be 15 m [50 feet] and the sample size a 600 mm by 750 mm [3 feet by 2.5 feet] rectangle. The angular aperture of both the photoreceptor and light projector shall be 10 minutes of arc. The reference center of the sample and the reference axis shall be taken perpendicular to the test sample.

4. Bead Retention - When tested with a 50 mm by 150 mm [2 in by 6 in] sample bent over a 13 mm [½ in] diameter mandrel with the 50 mm [2 in] dimension perpendicular to the mandrel axis, microscopic examination of the arc on the mandrel shall show no more than 10% of the beads are entrapped in the binder and less than 40% of the surface of the bead.
5. Application - The preformed plastic material shall be capable of application to non-defective pavement surfaces that are dry and free from dirt or other foreign matter. For normal application, the pavement temperature should be at least 15°C [60°F] and rising.
6. Special Instructions - Special instructions should be supplied by the vendor for application to be made at pavement temperatures below 15°C [60°F]. Application shall be according to manufacturer's recommended procedures. Plastic pavement marking materials shall only be applied to surfaces with temperatures within the range specified by the manufacturer for optimum adhesion.
7. Adhesive, Activators or Special Coatings - Adhesive, activators or special coatings for various types of pavement surfaces shall be provided with the preformed plastic material. Detailed information must be supplied with the material outlining required application procedures for such adhesives, activators, or special coating.
8. Preformed Plastics - Performed plastics shall be capable of being applied to new asphalt pavement immediately prior to the final rolling of the new surface and of being rolled into place with conventional pavement and highway rollers. The plastic material and adhesives used in such applications shall be of the type that water used on the roller to prevent asphalt pickup shall not be harmful to the successful application of the plastic.
9. Special Equipment - Special equipment necessary for the successful installation of any preformed plastic material shall be available from the manufacturer of the plastic material on a lease, loan, or purchase basis. These materials following application shall be immediately ready for traffic without any damage to the material surface or injuries to passing vehicles. The retro reflective pavement marking tapes are intended for use as longitudinal lines such as lane lines, edge lines, channelization lines, gore markings or stop bars and crosswalk

lines, and shall be inlaid into new asphaltic concrete by using a steel pavement roller while the pavement is at temperatures between 130°F. and 150°F.

2.2 MATERIALS -PAINT

A. Pavement Marking Paint for final and temporary pavement marking shall meet the requirements of Federal Specification TT-P-1952E. Either Type N, regular dry traffic paint or Type F, fast dry traffic paint may be used.

PART 3 - EXECUTION

3.1 GENERAL

A. All pavement lines and markings shall be applied in accordance with the Manual on Uniform Traffic Control Devices. Longitudinal lines placed on tangent roadway segments shall be straight and true. Longitudinal lines placed on curves shall be continuous smoothly curved lines consistent with the roadway alignment. All pavement markings placed shall meet the tolerance limits shown on the plans.

B. Broken lines shall consist of alternate 3 m [10 ft] painted line segments and 9m [30 ft] gaps. Temporary pavement marking lines, will be applied as many times as necessary to properly delineate traffic lanes for the safe passage of traffic. Bi-directional delineators may be used in place of temporary lines. Delineators will be applied at 12 m [40 ft] intervals.

C. In overnight lane closure areas that are not to be overlaid, temporary plastic lines or raised pavement markers shall be used through the length of the taper.

D. The plastic final pavement lines and markings shall be applied in accordance with the manufacturer's recommendations by the inlay method of application.

3.2 ESTABLISHMENT PERIOD

A. Inlaid plastic pavement lines and marking material furnished and installed under this contract for final pavement markings shall still be subject to a six-month period of establishment.

B. The period of establishment shall commence as soon as the plastic pavement lines and markings are complete and in place and shall continue for six months. At the end of the establishment period, a minimum of 95% of the plastic pavement lines and markings shall still be in place to be acceptable.

C. If less than 95% of the plastic pavement lines and markings are in place after six months, the Contractor shall replace all unsatisfactory plastic pavement lines and markings on the project without additional payment. Plastic pavement lines and markings designated for replacement shall be installed according to these specifications, unless otherwise directed. Plastic pavement lines and markings replaced at the end of the six month establishment period will not be subject to a further establishment period.

3.3 PAVEMENT MARKING TAPE MATERIAL REPLACEMENT PROVISION GUARANTEE

A. The Contractor shall supply the Owner with a written guarantee for a minimum of two years for all materials contained in these specifications.

B. The period of guarantee shall begin from the date of application to the road.

3.4 PREPARATION OF SURFACE FOR PAINT

A. Immediately before applying the pavement marking paint to the pavement or curb, the surface shall be dry and entirely free from dirt, grease, oil, or other foreign matter. Surface preparation for application of plastic markings shall conform to the manufacturer's recommendations.

3.5 APPLICATION OF PAINT

A. Prior to applying paint for final pavement lines, the Contractor shall perform a test for paint thickness by furnishing and placing a piece of smooth, clean metal with an area of at least 0.1 m^2 [144 in^2] in the path of the striping truck. The striping truck shall be passed over the piece of metal, painting the surface as it passes, without applying beads. The result of this test will be used to determine the pressure setting and speed of the truck when applying paint to obtain the specified thickness. Additional paint thickness testing may be required on the final paint markings. The wet thickness of paint without beads on final pavement lines shall be a minimum of 0.400 mm [16 mils].

B. On other final pavement markings and on curb, where the paint is applied by hand painting or spraying, application shall be in two uniform covering coats, each at least 0.25 mm [10 mils] thick. Before the second coat of paint has dried, the glass beads shall be applied by a pressure system that will force the glass beads onto the undried paint as uniformly as possible.

C. Glass beads shall be applied to the final and temporary pavement lines, marking and curb at the rate of 0.72 kg/L [4.5 lb/gal] of paint and in sufficient quantity to assure complete and uniform coverage of hand painted surfaces.

D. Temporary painted lines and markings shall be applied as specified for permanent painted lines, except that the thickness shall be a minimum of 0.400 mm [16 mils].

E. Temporary pliant polymer marking material shall be used for temporary markings on the final pavement and on pavements not to be resurfaced when such pavement markings do not conform to the final pavement markings pattern.

F. Newly painted lines, markings and curb shall be protected from traffic by the use of cones, stationary vehicles or other approved methods until the paint is dry.

3.6 REMOVING LINES AND MARKINGS

A. When it is necessary to remove pavement lines and markings, it shall be done by grinding, high temperature flame, sand blasting, solvent or other acceptable means. The method chosen must be capable of completely eradicating the existing line or marking without damage to the pavement. Burning and grinding to remove temporary markings from final pavement or from existing pavement not to be resurfaced will not be permitted.

END OF SECTION

SECTION 02601

MANHOLES, COVERS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Construct manholes, covers, frames, brick masonry, inverts and apply waterproofing in conformance with the dimensions, elevations, and locations shown on the Drawings and as specified herein.

B. Related Work Specified Elsewhere (when applicable):
   1. Final sewer testing is specified in this Division.
   2. Pipe, excavation, backfill, paving and dewatering are specified in the appropriate Sections in this Division.
   3. Concrete and grout are specified in Division 3.

1.2 QUALITY ASSURANCE

A. Precast Manhole Base, Barrel and Top Sections:
   1. Conform to ASTM C478 except as modified herein, and on the Drawings.
   2. Average strength of 4,000 psi at 28 days.
   3. Testing:
      a. Determine concrete strength by tests on 6-inch by 12-inch vibrated test cylinders cured in the same manner as the bases, barrels and tops.
      b. Have tests conducted at the manufacturer's plant or at a testing laboratory approved by the Engineer.
      c. Have not less than 2 tests made for each 100 vertical feet of precast manhole sections.

B. Manhole Steps –
   1. Conform to ASTM C478-06 for load carrying capacity and pull out resistance.
   2. Acceptable Manufacturers:
      a. Parson Environmental Products, Inc.
      b. M. A. Industries, Inc.
      c. Or equal

C. Frames and Covers:
   1. Acceptable Manufacturers:
      a. EJ Castings
      b. Neenah Foundry Company.
      c. Or equal

D. Masonry:
   1. Brick: Shall comply with the ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
   2. Cement: ASTM C150.
   3. Hydrated Lime: ASTM C207
   4. Sand: ASTM C33

E. Waterproofing:
   1. Acceptable Manufacturers:

a. Karnak #220 AF Fibered Emulsion Dampproofing, Karnak Corp., Clark, NJ.
b. PPS 922 Superseal, International Precast Supply.
c. Or equal.

F. Pipe connections shall conform to ASTM C 923, "Standard Specifications for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

1.3 SUBMITTALS

A. Submit shop drawings and manufacturer's literature in conformance with Section 01340 and the Standard General Conditions of the Construction Contract.
B. Precast Manhole Sections: Submit test results and receive approval from the Engineer prior to delivery to the site.

PART 2 - PRODUCTS

2.1 PRECAST MANHOLE SECTIONS

A. Dimensions, shall be as shown on the Drawings:
1. Base & Riser Sections:
a. Diameter: As shown on the Drawings.
b. Length: As required.
c. Wall Thickness: Not less than 5 inches.
d. Joints: Bell-and-spigot or tongue-and-groove formed on machine rings to ensure accurate joint surfaces.
2. Tops:
a. Diameter: Eccentric cone type, 24 inches I.D. at top, 48 inches I.D. at bottom unless otherwise shown on the Drawings.
b. Height: 4 feet.
c. Wall thickness: Not less than 5 inches at the base, tapering to not less than 8 inches at the top.
d. Joints: Bell-and-spigot or tongue-and-groove formed on machine rings to ensure accurate joint surfaces.
e. Exterior face of cone sections shall not flare out beyond the vertical.
3. Flat Slab Tops:
a. Location: Where shallow installations do not permit the use of a cone-type top and where indicated on the Drawings.
b. Slab thickness: Not less than 6 inches.
c. Constructed to support an HS-20 wheel loading.

B. Openings:
1. Provide openings in the risers to receive pipes entering the manhole.
2. Make openings at the manufacturing plant.
3. Size: To provide a uniform annular space between the outside wall of pipe and riser.
4. Location: To permit setting of the entering pipes at the correct elevations.
5. Openings shall have a flexible watertight union between pipe and the manhole base.
a. Cast into the manhole base and sized to the type of pipe being used.

b. Type of flexible joint being used shall be approved by the Engineer. Install materials according to the Manufacturer's instructions.
   i. Lock Joint Flexible Manhole Sleeve made by Interpace Corporation.
   ii. Kor N Seal made by National Pollution Control System, Inc.
   iii. Press Wedge II made by Press-Seal Gasket Corporation.
   iv. A-Lok Manhole Pipe Seal made by A-Loc Corporation.
   v. Or equivalent.

C. Joints:
1. Joint gaskets to be flexible self-seating butyl rubber joint sealant installed according to manufacturer's recommendations. Install a double row of joint sealants for every manhole joint. For cold weather applications, use adhesive with joint sealant as recommended by manufacturer.
   Acceptable Materials:
   a. Kent-Seal No. 2
   b. Ram-Nek
   c. Or equivalent.
2. Joints between precast sections shall conform to related standards and manufacturer's instructions.
3. All manholes greater than 6 ft. diameter and all manholes used as wet wells, valve pits and other dry-pit type structures shall be installed with exterior joint collars. The joint collar shall be installed according to the manufacturer's instructions.
   Acceptable Materials:
   a. MacWrap exterior joint sealer as manufactured by Mar-Mac Manufacturing Company
   b. Cretex External Joint Wrap
   c. Or equivalent.

D. Waterproofing:
1. The exterior surface of all manholes shall be given two coats of waterproofing material at a application rate as recommended by the manufacturer.
2. The coating shall be applied after the manholes have cured adequately and can be applied by brush or spray in accordance with the manufacturer's written instruction.
3. Sufficient time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat.

E. Frost Protective Wrapping:
1. The frost protective wrap shall be constructed of an ultraviolet resistant polyethylene material and shall be a minimum thickness of 6 mils.

2.2 FRAMES AND COVERS

A. Standard Units:
1. Made of cast iron conforming to ASTM A48-76, Class 30 minimum.
2. Have machined bearing surfaces to prevent rocking.
3. Castings shall be smooth with no sharp edges.
4. Constructed to support an HS-20 wheel loading.
5. Dimensions and Style shall conform to the Drawings, Standard castings differing in non-essential details are subject to approval by the Engineer:

a. Covers -solid with sewer in 3-inch letters diamond pattern.
b. Frame - 24-inch diameter clear opening, with flange bracing ribs.

6. Minimum weight of frame and cover shall be 370 lbs.

B. Water Tight Units:
1. Same features as above for Standard Units, with 22-inch diameter minimum clear opening.
2. Minimum weight of frame and cover shall be 510 lbs.

2.3 MANHOLE STEPS

A. Polyethylene coated steel safety type designed with a minimum concentrated live load of 300 pounds.
B. Thoroughly clean all surfaces to be embedded with a suitable cleaning agent to ensure that the surfaces are free from all foreign matter such as dirt, oil and grease.
C. The steps shall become thoroughly dry before being placed into the concrete.
D. All steps shall be cast into walls of the precast section so as to form a continuous ladder with a distance of 12-inches between steps.

2.4 MASONRY

A. Brick:
1. Sound, hard, uniformly burned, regular and uniform in shape and size, compact texture, and satisfactory to the Engineer.
2. Immediately remove rejected brick from the work.

B. Mortar:
1. Composition (by volume):
a. 1 part Portland cement.
b. 1/2 part hydrated lime.
c. 4-1/2 parts sand.
2. The proportion of cement to lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.

C. Cement shall be Type II Portland cement.
D. Hydrated lime shall be Type S.
E. Sand:
1. Shall consist of inert natural sand.
2. Grading:

Sieve	Percent Passing
No. 4	100
No. 8	95-100
No. 16	70-100
No. 30	40-75
No. 50	10-35
No. 100	2-15
No. 200	0-5

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Precast Manhole Sections:
   1. Perform jointing in accordance with manufacturer's recommendations and as approved by the Engineer.
   2. Install riser sections and tops level and plumb.
   3. Make all joints watertight.
   4. When necessary, cut openings carefully to prevent damage to barrel sections and tops. Replace damaged manhole sections and tops at no additional cost to the Owner.
   5. When manhole steps are included in the Work, install barrel sections and tops so that steps are in alignment.

B. Drop Manholes:
   1. The difference in elevation between the invert of the inlet pipe and outlet pipe is to be either less than 6-inches (which does not require a drop manhole) or more than 24-inches (which does require a drop manhole).
   2. Where difference in elevation between the invert of the inlet pipe to the invert of the outlet pipe exceeds 24 inches, construct a drop manhole as shown on the Drawings or as directed by the Engineer.

C. Adjust to Grade:
   1. Adjust tops of manholes to grade with brick masonry.
   2. Concrete rings are not acceptable for adjusting to grade.
   3. In paved areas, set frame and cover to final grade after binder pavement is placed and the grade of surface pavement has been determined.

D. Pipe Connections to Manholes: Connect pipes to manholes with joint design and materials approved by the Engineer. Special care shall be taken to ensure that the openings through which pipes enter the structure are watertight.

E. Invert Channels:
   1. After manhole and all pipes entering or exiting the manhole have been installed, construct the invert channels and shelf.
   2. Channels to be smooth and semicircular in shape conforming to the inside of the adjacent sewer section.
   3. Make changes in direction of flow with smooth curves having a radius as large as permitted by the size of the manhole.
   4. Stop the pipes at the inside face of the manhole where changes of direction occur.
   5. Form invert channels and shelf with brick. Form invert channels and shelf with smooth and carefully shaped 2500 psi concrete with no voids. Coat concrete with non-slip, hi-build epoxy coating.
   6. The maximum change in elevation from the invert of the inlet pipe to the invert of the outlet pipe is 6-inches. Shape invert to make smooth transition in vertical grade.
   7. Slope the floor of the manhole (shelf) to the flow channel, as shown on the Drawings.

F. Masonry:
   1. Laying Brick:

a. Use only clean bricks in brickwork for manholes.
b. Moisten the brick by suitable means until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
c. Lay each brick in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and thoroughly bond as directed.
d. Construct all joints in a neat workmanlike manner. Construct the brick surfaces inside the manholes so they are smooth with no mortar extending beyond the bricks and no voids in the joints. Maximum mortar joints shall be 1/2 inch.
e. Outside faces of brick masonry shall be plastered with mortar from ¼-inch to 3/8-inch thick.
f. Completed brickwork shall be watertight.

2. Curing:
a. Protect brick masonry from drying too rapidly by using burlaps which are kept moist, or by other approved means.
b. Protect brick masonry from the weather and frost as required.

G. Frames and Covers:
1. Set all frames in a full bed of mortar, true to grade and concentric with the manhole opening.
2. Completely fill all voids beneath the bottom flange to make a watertight fit.
3. Place a ring of mortar at least one inch thick around the outside of the bottom flange, extending to the outer edge of the manhole all around its circumference.
4. Clean the frame seats before setting the covers in place.

H. Plugging and Patching:
1. Fill all exterior cavities with non-shrink grout and with bituminous waterproofing once the concrete and mortar has set.
2. Touch up damaged water proofing.

I. Cleaning:
1. Thoroughly clean manholes, steps, frames and covers of all debris and foreign matter.

J. Bedding and Backfilling:
1. Bedding of manholes shall be 6 inches of 3/4" screened stone.
2. Backfill a minimum of 18 inches all around manhole with gravel borrow.

K. Frost Protective Wrap:
1. The Contractor shall comply with the manufacturer's instructions for the particular conditions of installations in each case.
2. Clean each manhole exterior of all dirt and remove any sharp protrusions.
3. Apply two 6-inch wide vertical strips of bituminous waterproofing material and/or duct tape from the top to bottom of the manhole per layer.
4. Prior to installing pipe through each manhole or valve pit, wrap each manhole to the maximum depth of frost penetration, but not less than 5 feet below grade, with four layers of the polyethylene material by beginning the wrap at the adhesive strip and proceeding around the manhole, valve pit, etc., continuously by overlapping the adhesive strip by 24 inches on the final layer. Cut the polyethylene wrap in areas where piping exits the manhole. The size of the cut is to be equivalent to the pipes outside diameter.

5. Tuck and pleat the polyethylene wrap at the top of each manhole in a continuous manner, minimizing the size of each fold. Extend the polyethylene wrap past the top of the manhole frame and temporarily tuck the remainder inside the frame, until final backfill and paving.
6. In paved areas, cut the polyethylene wrap flush with the manhole rim after the pavement is in place.
7. In unpaved areas, pull the polyethylene wrap together, and tie around frame with galvanized wire.
8. Protect the installed frost barrier from harmful weather exposures and from possible physical abuses, where possible by prompt installation of concealing work or, where that is not possible, by temporary covering or enclosure.
9. Backfill around the manhole/frost barrier with material as outlined in Section 02200 - Earthwork.

3.2 MANHOLE TESTING

A. General:
   1. Perform a vacuum test on all manholes
   2. Perform all testing in the presence of the Engineer.
   3. Suitably plug all pipes entering each manhole and brace plugs to prevent blow out.

B. Vacuum Test:
   1. The manhole shall be tested by a vacuum test after assembly of the manhole, connection piping and backfilling. Vacuum testing to be conducted prior to construction of invert channels.
   2. Plug all lifting holes completely with non-shrink grout.
   3. Properly tighten all boot clamps and brace all plugs to prevent them from being sucked into the manhole.
   4. Install the testing equipment according to the manufacturer's instructions.
   5. A vacuum of 10 inches of Hg shall be drawn on the manhole and the loss of 1 inch of Hg vacuum timed. The manhole shall be considered to have passed the test if the time for the loss of 1 inch of Hg vacuum is:
      a. Greater than 2 minutes for manholes less than 10-feet deep.
      b. Greater than 2.5 minutes for manholes 10 to 15-feet deep.
      c. Greater than 3 minutes for manholes more than 15-feet deep.
   6. If the manhole fails the initial test, the Contractor shall locate the leak(s) and make repairs. The manhole shall be retested until a satisfactory test result is obtained.

C. Manhole Repairs:
   1. Correct leakage by reconstruction, replacement of gaskets and/or other methods as approved by the Engineer.
   2. The use of lead-wool or expanding mortar will not be permitted.

D. After the manholes have been backfilled and prior to final acceptance, any signs of leaks or weeping visible inside the manholes shall be repaired and the manhole made watertight.

END OF SECTION

SECTION 02622

POLYVINYL CHLORIDE (PVC) NON-PRESSURE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Provide and install PVC non-pressure pipe and fittings of the size(s) and type(s) and in the location(s) shown on the Drawings and as specified herein.

B. Related Work Specified Elsewhere: (When Applicable)
   1. Excavation and backfill, dewatering, pavement, borrow and bedding material, and cleaning and testing requirements are specified in the appropriate sections of this division.
   2. Pipe & Pipe Fittings - General is specified in Division 15.

1.2 QUALITY ASSURANCE

A. Manufacturers:
   1. Ipex
   2. JM Eagle
   3. EJ Prescott
   4. Or equivalent.

1.3 SUBMITTALS TO THE ENGINEER

A. Submit shop drawings in accordance with the General Conditions of the Construction Contract.

B. Submit manufacturer's "Certification of Conformance" that pipe and fittings meet or exceed the requirements of these Specifications.

C. Submit other documents as specified in the appropriate Sections of this Division.

1.4 DELIVERY STORAGE AND HANDLING

A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets and other materials.

B. Carefully inspect all materials at the time of delivery and just prior to installation.

C. Carefully inspect all pipe and fittings for:
   1. Defects and damage
   2. Deviations beyond allowable tolerances for joint dimensions.
   3. Removal of debris and foreign matter.

D. Examine area and structures to receive piping for:
   1. Defects, such as weak structural components that adversely affect the execution and quality of work.
   2. Deviations beyond allowable tolerance for pipe clearances.

E. All materials and methods not meeting the requirements of the Contract Documents will be rejected.

F. Immediately remove all rejected materials from the project site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe and Fittings:
   1. The polyvinyl chloride pipe and fittings, including those required for stubs, shall conform to ASTM standard specification for PVC Sewer Pipe and Fittings, Designation D 3034 (SDR 35) (4" to 15"), F679 (18" to 27"), or F1760-01 (for recycled pipe, all diameters).
   2. Straight pipe shall be furnished in lengths of not more than 14 feet.
   3. Saddles will not be allowed.

B. Joints:
   1. Joints for the polyvinyl chloride pipe shall be push-on joints using factory installed elastomeric ring gaskets.
   2. The gaskets shall be securely fixed into place by the manufacturer so that they cannot be dislodged during joint assembly.
   3. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and ground water, and which will endure permanently under the conditions of the proposed use.
   4. The joints shall conform to ASTM Specifications for Joints for Drain and Sewer Plastic Pipes using Flexible Elastomeric Seals, Designation D3212-76.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Inspection:
   1. Each pipe unit shall be inspected before being installed. No single piece of pipe shall be laid unless it is generally straight.
   2. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length.
   3. If a piece of pipe fails to meet this requirement for straightness it shall be rejected and removed from the site.
   4. Any pipe unit or fitting discovered to be defective either before or after installation shall be removed and replaced with a sound unit.

B. Jointing:
   1. All pipe and fittings shall be cleared of all debris, dirt, etc., before being installed and shall be kept clean until accepted in the completed work.
   2. Pipe and fittings shall be installed to the lines and grades indicated on the drawings or as required by the Engineer. Care shall be taken to ensure true alignments and gradients.
   3. All joint surfaces shall be cleaned. Immediately before jointing the pipe, the bell or groove shall be lubricated in accordance with the manufacturer's recommendation.
   4. Each pipe unit shall than be carefully pushed into place without damage to pipe or gasket. Suitable devices shall be used to force the pipe units together so that they will fit with a minimum open recess inside and outside and have tightly

sealed joints. Care shall be taken not to use such force as to wedge apart and split the bell or groove ends.

5. Joints shall not be "pulled" or "cramped" unless permitted by the Engineer.

C. Service Connections:
   1. All service connections to new pipe shall utilize a wye fitting.
   2. All service connections must enter the top half of the mainline pipe.
   3. Service connections shall be 6-inch, minimum, unless otherwise noted.
   4. Contractor shall provide all necessary fittings, adapters and couplings to connect the service to the sewer main.
   5. Service laterals shall be placed at 2% slope, unless otherwise noted. If 2% slope is not available, notify the Engineer.
   6. Contractor shall maintain the trench for sufficient time for the Engineer to inspect the work. Contractor shall provide 3 working day notice to the Engineer.

D. Pipe Deflection:
   1. Pipe provided under this specification shall be installed so there is no more than a maximum deflection of 5.0 percent. Such deflection shall be computed by multiplying the amount of deflection (normal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
   2. The Contractor shall wait a minimum of 30 days after completion of a section of sewer, including placement and compaction of backfill, before measuring the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
   3. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.

E. Testing:
   1. Clean and test pipe in accordance with appropriate sections of this division.
   2. CCTV pipe in accordance with Section 02755.

END OF SECTION

SECTION 02650

BURIED UTILITY MARKINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. This work shall consist of providing and installing utility line markings above all buried lines installed as part of this contract and replacing existing markings disturbed as part of this contract. Buried utilities are indicated on the Civil and Electrical Drawings.

B. Related Work Specified Elsewhere:
   1. Pipe, excavation, backfill, insulation are specified in the appropriate Sections in this Division.

1.2 SUBMITTALS

A. Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.

B. Submit manufacturer's "Certification of Conformance" that utility markings meet or exceed the requirements of these Specifications.

C. Submit manufacturers specifications for utility markings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and color shall be in accordance with latest AASHTO specifications for pipe and utility marking.

B. Marking tape color shall be in accordance with latest American Public Works Association (APWA) Uniform Color Code and American National Standards Institute ANSI Standard Z535.1, Safety Color Code specifications for buried utility marking as noted in the Schedule below.
   1. Schedule

Marker Color	Buried Utility
Blue	Potable Water &Associated lines
Green	Sanitary Sewers, Storm Drain and other Drain lines
Orange	Telecommunication, signal, alarm
Purple	Reclaimed, Recycled, Irrigation Water and Slurry Lines
Red	Electric Power lines cables conduits and lighting cables
Yellow	Gas, Oil, Steam, Petroleum or Gaseous Material Lines

   2. Warning Information shall be in Black Letters with typical wording of:
      a. "CAUTION: BURIED (NAME OF UTILITY LINE) BELOW"

C. For ferrous pipe material use 0.004" minimum polyethylene film; 6" wide clearly marking type of buried utility.

D. For non-ferrous pipe material (e.g. Concrete, PVC, PE, etc.) use detection tape composite of polyethylene and metallic core 6" wide clearly marking type of buried utility.
E. Seton Identification Products, New Haven, CT, Utility Safeguard LLC or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Marking tape shall be installed over utility lines centerline and buried 24" below grade.
B. Markings damaged during opening of trench shall be reinstalled with 2' overlap at broken sections.

END OF SECTION

SECTION 02655

COUPLINGS & CONNECTORS FOR BURIED APPLICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install couplings and connectors of the type and size in the location shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Minimum pressure rating equal to that of the pipeline in which they are to be installed.

B. Couplings and connectors, other than those specified herein, are subject to the Engineer's approval. Acceptable Manufacturers:
   1. Romac Industries
   2. Krausz
   3. Smith Blair
   4. For Meter Box Company
   5. Or Equal

C. Reference Standards:
   1. AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
   2. AWWA C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
   3. AWWA C116 – Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
   4. AWWA C153 – Ductile-Iron Compact Fittings
   5. AWWA C213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings
   6. AWWA C219 – Bolted, Sleeve-Type Couplings for Plain-End Pipe

1.3 SUBMITTALS

A. Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.

B. Submit manufacturers product data and installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All Couplings and Connectors:
   1. Gasket Materials: Composition suitable for exposure to the liquids to be contained within the pipes.
   2. Diameters to properly fit the specific types of pipes on which couplings and connectors are to be installed.

B. Sleeve Type Transition Couplings (for 4 – 12” pipe size)
   1. Buried Non-Restrained Couplings:
      a. Two top facing bolt design

b. Fusion bonded epoxy ductile iron center sleeve, end rings and bolt guides. Ductile iron meeting or exceeding ASTM A536, Grade 65-45-12.
c. Two wedge-section EPDM or NBR rubber gaskets compounded for water service. NSF-61 certified for potable water service.
d. Ductile iron heat treated grippers, 304 stainless steel draw hooks, and reinforced nylon ramp runners.
e. Nuts and bolts shall be 304 Stainless Steel with rolled thread and anti-galling compound.
f. Couplings shall be long barrel type.
g. Coupling shall be fusion bonded epoxy coated meeting AWWA C213 and NSF-61 standards for potable water applications.
h. Acceptable Manufacturers:
    i. Romac Industries – Macro HP™
    ii. Krausz – Hymax® 2
    iii. Smith Blair – Model 421
    iv. Or Equal

2. Buried Restrained Couplings:
    a. Two top facing bolt design
    b. Fusion bonded epoxy steel or ductile iron center sleeve and end rings.
    c. Two wedge-section EPDM or NBR rubber gaskets compounded for water service and NSF-61 certified.
    d. 304 Stainless Steel bridge or Armor over gasket in expansion zone.
    e. Nuts and bolts shall be 304 Stainless Steel with rolled thread and anti-galling compound.
    f. Couplings shall be long barrel type.
    g. Coupling shall be fusion bonded epoxy coated meeting AWWA C213 and NSF-61 standards for potable water applications
    h. Acceptable Manufacturers:
        i. Romac Industries – Alpha™
        ii. Krausz – Hymax Grip
        iii. Smith Blair – Pipe Lock Coupling
        iv. Or Equal

C. Solid Sleeve Couplings
    1. Solid sleeves shall be ductile iron with mechanical joint ends.
    2. Couplings shall meet AWWA/ANSI C-153/A21.53 and C-111/A21.11 for joints, and C-104/A21.4 for cement lining in sizes 3"-24".
    3. Nuts and bolts shall be ductile iron low alloy steel per ANSI/AWWA A21.11/C-111.
    4. Acceptable Manufacturers:
        a. Romac – Model 501
        b. Smith Blair – Model 441.
        c. Ford – Model FC1 or FC2A
        d. Or Equal

D. Flexible Couplings for drain connections (Fernco or equal)
    1. Rubber material with stainless steel clamps
    2. Must provide a positive seal against infiltration and exfiltration

3. Coupling materials must conform to applicable portions of ASTM C443 (Concrete), C564 (Cast Iron), D1869 (A.C.), D5926 (PVC), C1173 (transition) and CSA B602.

E. Mechanical Joint Adaptors (Foster Adaptor® – Infact Corporation)
   1. Required to connect fittings and valves with mechanical joints
   2. Ductile iron construction mechanical joint bolt pattern.
   3. Bolts and nuts shall meet AWWA C-111.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Sleeve Type Couplings:
   1. Thoroughly clean pipe ends a minimum of 12-inches from the ends prior to installing couplings and use soapy water as a gasket lubricant.
   2. Slip an end ring and gasket over each pipe and place the center sleeve centered over the joint.
   3. Insert the other pipe length into the center sleeve the proper distance.
   4. Press the gaskets and end rings evenly and firmly into the center sleeve flares.
   5. For two-bolt systems, insert or tighten the bolts, finger tighten and progressively tighten nuts on the top of the coupling with a torque wrench applying the torque recommended by the manufacturer. For multiple bolt systems, insert or tighten the bolts, finger tighten and progressively tighten diametrically opposite nuts around the coupling with a torque wrench applying the torque recommended by the manufacturer.
   6. Insert and tighten the tapered threaded lock pins as needed.

B. Install thrust rods, supports, and other provisions to properly support pipe weight and axial equipment loads.

END OF SECTION

SECTION 02751

SEWER FLOW CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: During the installation, replacement, rehabilitation and/or testing of sanitary sewer lines and sanitary sewer manholes via open-cut or trenchless approach, the Contractor shall maintain and control flow around the pipe segment(s) or structure(s) that are temporarily out of service. Existing sewer services shall remain live at all times during the progress of the Work. Sewer flow control which extends outside of Contractor work hours shall be completed in accordance with Section 01515. All temporary pumping equipment shall meet the requirements outlined in local noise regulations.

B. Additional Requirements Specified Elsewhere:
   1. Summary of Work: Section 01010
   2. Submittals: Section 01340
   3. Sewer Line Cleaning: Section 02752
   4. Television Inspection of Sewers: Section 02753
   5. Final Sewer Testing: Section 02755

1.2 SUBMITTALS

A. In accordance with the requirements of Section 01340. Additional specific information required is listed below.
   1. Proposed schedule, sequence of construction, duration of activities and description of sewer control methods to be utilized for each element of the project.
   2. Technical data (including capacity and fuel tank size) of any portable temporary pumping equipment to be used during normal Contractor work hours.
   3. Supplemental information required under Section 01515 for sewer flow control which extends beyond Contractor work hours.

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 COORDINATION OF WORK

A. Provide all labor and equipment necessary to coordinate work of this section and maintain communications.

B. Notify all personnel, including but not limited to the Owner, Engineer, and Utility Companies seven days in advance of any temporary bypass pumping work. The Owner will identify personnel to be notified in addition to those identified by the Contractor.

C. Contractor shall coordinate temporary bypass pumping operations with the Owner and Engineer on a daily basis.

3.2 PERFORMANCE

A. General
   1. The Contractor shall install and test all sewer flow control methods to the satisfaction of the Owner and Engineer prior to proceeding with the Work.
   2. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.

B. Plugging or Blocking:
   1. Insert plug at a manhole upstream of line to be inspected and tested.
   2. Plug shall be so designed that all or any portion of the sewage flows can be released.
   3. Flows shall be shut off or substantially reduced during line testing.

C. Pumping and Bypassing:
   1. When required, supply the necessary pumps, conduits and other equipment (including standby equipment) to divert the flow of sewage around the line in which work is being performed.
   2. Furnish the necessary labor and 24-hour supervision to set up, test and operate the pumping and bypassing system.
   3. Any temporary pumps, piping, fuel storage, or other appurtenances associated with the portable temporary pumping equipment shall be either located above the 100-year flood elevation or protected against flotation or other damage which would be caused by a flood event.

END OF SECTION

SECTION 02752

SEWER LINE CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Provide all equipment necessary for the proper cleaning of the sewers prior to the joint testing operations and/or closed circuit television inspection.

B. Related Work Specified Elsewhere: Sewer line joint testing and closed circuit television inspection are specified in this Division.

1.2 REFERENCE

A. The type of pipe cleaning (light vs heavy) shall be chosen based on the definitions in the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Version 7.0 standards.

1. Light cleaning definition – Cleaning and removal of settled deposits when the deposits are less than the following percentage of the pipe diameter:
   a. Pipe diameters less than or equal to 12-inches: < 25%
   b. Pipes diameters between 13-inches and 24-inches: < 15%
   c. Pipes diameters between 25-inches and 30-inches: < 10%
   d. Pipe diameters greater than 30-inches: not applicable (use heavy cleaning)
2. Heavy cleaning definition – Cleaning and removal of settled deposits when the deposits are greater than the following percentage of the pipe diameter:
   a. Pipe diameters less than or equal to 12-inches: > 25%
   b. Pipes diameters between 13-inches and 24-inches: >15%
   c. Pipes diameters between 25-inches and 30-inches: >10%
   d. Pipe diameters greater than 30-inches: all pipes regardless of the amount of deposits

PART 2 - PRODUCTS

2.1 MATERIALS

A. High Velocity Hydro-Cleaning Equipment shall:

1. Have a minimum of 400 feet of high pressure hose.
2. Have multiple high velocity nozzles, as follows:
   a. Standard 35 degree nozzle with multiple rear jets and one front jet.
   b. Sand nozzle capable of transporting sand and gravel to the downstream manhole; and
   c. Rotating nozzle for removal of grease and scale.
3. Include a high velocity gun for washing and scouring manhole walls and floor.
4. Be capable of producing flows from a fine spray to a long distance solid stream.
5. Include a water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
6. Have equipment operating controls located above ground.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Select cleaning equipment based on the conditions of the lines at the time the work commences.
   1. Light cleaning (as defined by NASSCO PACP): Use high pressure water jetting equipment, brushes and swabs.
   2. Heavy cleaning (as defined by NASSCO PACP): Use high pressure water jetting equipment specifically designed for the intended use.

B. Use selected equipment to remove all dirt, grease, rock and other deleterious materials and obstructions.

C. Protect existing sewer lines from damage caused by improper use of cleaning equipment.

D. Take precautions to avoid damage or flooding to public or private property being served by the line being cleaned.

E. Removal of Materials:
   1. Remove all solids and semi-solids at the downstream manhole of the section being cleaned.
   2. Passing material from one section of a line to another will not be permitted.

F. Disposal of Materials: Remove from the site and dispose of all solids or other waste materials recovered during the cleaning operations in an approved manner.

3.2 DETERMINING TYPE OF CLEANING

A. All heavy cleaning must be coordinated with RPR or Engineer verbally or written for each pipe before any heavy cleaning commences.

3.3 FIELD QUALITY CONTROL

A. Acceptance of this portion of the work may be made upon completion of subsequent television inspection and shall be to the complete satisfaction of the Engineer.

END OF SECTION

SECTION 02753

TELEVISION INSPECTION OF SEWERS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish all necessary labor, materials, supervision and equipment to satisfactorily inspect gravity sewer lines and sewer service pipes as required by the Contract Documents by means of a closed circuit television (CCTV) system.

B. Related Work Specified Elsewhere: Sewer line cleaning and sewer flow control are specified in the appropriate sections in this Division.

1.2 QUALITY ASSURANCE

A. CCTV work shall be completed and delivered per the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Version 7.0 standards. Operators of CCTV equipment shall be currently certified in NASSCO PACP.

1.3 SUBMITTALS

A. Provide shop drawings as specified in the General Conditions and Section 01340.

B. Contractor shall submit copies of active NASSCO PACP certifications.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. The cameras shall be designed and constructed for sewer line inspection work. The mechanical design of the lens shall allow it to turn and rotate 360 degrees to provide a close up view of sewer pipe walls and sewer service pipes. The camera shall be designed to maintain proper orientation of the picture while the lens is turning and rotating.

B. The cameras shall be operative in 100% humidity conditions.

C. The lighting for the cameras shall be suitable to allow a clear picture of service pipes and the entire periphery of the mainline sewer pipe, such that joints, root intrusions, cracks, offset joints, deposits, etc. can be seen and identified by the Engineer.

D. The lens focus and rotational capabilities and the light intensity will be remotely controlled from an above ground television "studio".

E. The cameras shall produce a continuous, full color picture with a quality acceptable to the Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Flow Control:

1. A minimum of 75% of the periphery of the sewer line shall be visible at all times.

2. The Engineer may require that the line be plugged so that the entire periphery can be inspected. For details on sewer flow control, see Section 02751.

B. Operation:
   1. Perform inspection of sewer lines after lines have been suitably cleaned.
   2. When inspecting newly constructed sewer lines, introduce water into the sewer lines to be tested from the upstream manhole prior to the television inspection, but no more than 24 hours in advance of the inspection.
   3. Lines will be suitably isolated from the remainder of the sewer line as required.
   4. Move the cameras through the line in either direction at a moderate rate, not to exceed 30 feet per minute, as recommended by NASSCO PACP standards.
   5. The Engineer may require Contractor to pull cameras back to get a second view of a section of the pipe.
   6. Use manual winches, power winches, television cable reel powered rewinds, high-pressure hose and reels on jet-cleaning trucks, or a flexible pole, to move the camera through the sewer.
   7. If, during the inspection operation, the camera will not pass through the entire pipe section, the Contractor shall set up the equipment so that the inspection can be performed from the opposite manhole on the pipe segment.
   8. The screen monitor and winch operators shall be in full communication at all times.
   9. Remove all wires, screens, sand bags, etc. used in the television inspection process from the sewers at the completion of inspection of each sewer section.

C. Measurement:
   1. Measurement for location of defects, service connections, etc., shall be accurate to two tenths (0.2) of a foot over the length of the section being inspected.

D. Records:
   1. Printed records shall be provided, reflecting location of defects, service connections, etc., and shall be recorded per NASSCO PACP standards and stored to a NASSCO PACP-certified digital reporting software:
      a. Keep records and supply to the Engineer when the work has been completed.
      b. Show the exact location in relation to adjacent manholes, of each infiltration point discovered by the television camera.
      c. Show locations of laterals, unusual conditions, roots, break-in storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features.
   2. Inventory the houses and apparent empty lots bordering each section of sewer line that is inspected and compare results to the number and location of house services found during the inspection. Log inconsistencies and report them to the Engineer.
   3. Database
      a. One copy of the NASSCO PACP Exchange database shall be provided in digital format (MS Access).
   4. Video / Photographs:

a. Two copies of the video shall be provided on an external hard drive, downloaded or output from a NASSCO PACP-certified software: one copy to the Engineer and one copy to the Owner.

b. The video shall be digitally recorded, indexed by pipe section (labeled by manhole number or other means acceptable to Engineer) and allow for printing of still photographs.

c. Photographs shall be printed at Engineer's request and shall be identified on the back as follows:

Date_____; Section: MH#_____ to MH#_____
Diameter of Sewer _____; Distance from MH#_____ is _____LF
Description of item photographed _____
_____

END OF SECTION

SECTION 02755

FINAL SEWER TESTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Final sewer testing work includes the performance of testing and inspecting each and every length of sewer pipe, pipe joints and each item of appurtenant construction.
   2. Perform testing at a time acceptable to the Engineer, which may be during the construction operations, after completion of a substantial and convenient section of the work, or after the completion of all pipe laying operations.
   3. Provide all labor, pumps, pipe, connections, gages, measuring devices and all other necessary apparatus to conduct tests.

B. Related Work Specified Elsewhere (When Applicable):
   1. Excavation, backfill, dewatering, pipe, pipe fittings and manholes are specified in the appropriate Sections in this Division and/or Division 15.
   2. Manhole testing is specified in Section 02601 - Manholes, Covers and Frames.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:
   1. All sewers, manholes, and appurtenant work, in order to be eligible for acceptance by the Engineer, shall be subjected to tests that will determine the degree of watertightness and horizontal and vertical alignment.
   2. Thoroughly clean and/or flush all sewer lines to be tested, in a manner and to the extent acceptable to the Engineer, prior to initiating test procedures.
   3. Perform all tests and inspections in the presence of the Engineer and the plumbing or building inspector in accordance with the requirements of the local and state plumbing codes.
   4. Perform testing by test patterns determined by or acceptable to the Engineer.
   5. Remedial Work:
      a. Perform all work necessary to correct deficiencies discovered as a result of testing and/or inspections.
      b. Completely retest all portions of the original construction on which remedial work has been performed.
      c. Perform all remedial work and retesting in a manner and at a time acceptable to by the Engineer at no additional cost to the Owner.

B. Line Acceptance Tests (Gravity sewers with no active service connections):

1. Test all gravity sewer lines with no active service connections for leakage by conducting a low pressure air test.
2. Equipment:
   a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
   b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
   c. All air used shall pass through a single control panel.
   d. Connect 3 individual hoses:
      i. From the control panel to the pneumatic plugs for inflation.
      ii. From the control panel to the sealed sewer line for introducing the low pressure air.
      iii. From the sealed sewer line to the control panel for continually monitoring the air pressure rise in the sealed line.
3. Testing Pneumatic Plugs:
   a. Seal test all pneumatic plugs prior to using them in the actual test.
   b. Lay one length of pipe on the ground and seal both ends with the pneumatic plugs to be tested.
   c. Pressurize the sealed pipe to 5 psig.
   d. The pneumatic plugs are acceptable if they remain in place without bracing.
4. Testing Sewer Pipeline:
   a. After the sewer pipe has been cleaned and the pneumatic plugs checked, place the plugs in the sewer line at each manhole and inflate them.
   b. Introduce low pressure air into the sealed sewer pipeline until the air pressure reaches 4 psig greater than the average groundwater pressure.
   c. Allow a minimum of 2 minutes for the air pressure to stabilize to a minimum of 3.5 psig greater than the groundwater pressure. Groundwater is assumed to be at ground surface unless the Contractor can prove otherwise by test pitting.
   d. After the stabilization period, disconnect the air hose from the control panel to the air supply.
   e. The pipeline will be acceptable if the pressure decrease is not greater than l/2 psig in the time stated in the following table for the length of pipe being tested:

Pipe Diameter (inches)	Time (Min.) for Length of Pipe			
	0-100 ft	101-200 ft	201-300 ft	301-400 ft
4	2.0	2.0	2.0	2.0
6	3.0	3.0	3.0	3.0
8	4.0	4.0	4.0	5.0
10	5.0	5.0	6.0	8.0
12	5.5	5.5	8.5	11.5
15	7.0	8.5	13.0	17.0

Pipe Diameter (inches)	Time (Min.) for Length of Pipe 0-100 ft	101-200 ft	201-300 ft	301-400 ft
18	8.5	12.0	19.0	25.0
21	10.0	17.5	26.0	35.0
24	11.5	23.0	34.0	45.5
27 and larger	14.5	29.0	43.0	58.0

5. Test Results:
   a. If the installation fails the low pressure air test, determine the source of leakage.
   b. Repair or replace all defective materials and/or handiwork and repeat low pressure air test at no additional cost to the Owner.

C. Line Acceptance Tests (Gravity sewers with active services):
1. Test all new gravity sewer lines with active services by conducting a low pressure air test on all joints using a packer after all services have been connected or capped at the property line and all trenches backfilled but before the surface course of permanent pavement is installe.
2. Equipment:
   a. Closed-circuit television system.
   b. Testing devices (packer):
      i. Capable of isolating individual joints by creating a sealed void space around the joint being tested.
      ii. Constructed such that low pressure air can be admitted into the void area.
      iii. Shall contain a pressure gauge accurate to one tenth (0.1) psi in-line with the feed line to monitor the void pressure.
      iv. Capable of performing in sewer lines where flows do not exceed 1/4 of the pipe diameter without resorting to any method of flow control.
3. Testing Sewer Pipeline Joints:
   a. Where sewer pipeline joint testing is required, test procedures shall be in compliance with the requirements outlined in Specification Section 02754.
   b. Test all joints except those with visible infiltration.
   c. Water or chemical pressure testing may be used in lieu of air testing subject to review and approval by the Engineer.
   d. Re-clean and re-inspect all lines not approved by the Engineer at no additional cost to the Owner.
   e. Repairing of Joints:
      i. When a joint fails the pressure test, excavate and repair the failed joint. Repairing joints with chemical grout will not be permitted.
   f. The Engineer may request checking of the testing equipment for accuracy.
      i. Perform standard air test on a clean continuous section of pipe.
      ii. Repair the equipment if the void pressure drops.

g. Testing Operation Inspection:
   i. Reset each joint, as specified herein, prior to acceptance and final payment for joint testing. Retest all joints that fail until the test requirements are met.
h. The Contractor will supply a photograph of every joint that fails the pressure test.

D. Alignment Tests (Gravity Sewers):
1. Perform tests for the correctness of horizontal and vertical alignment on each and every length of gravity sewer pipeline between manholes.
2. Alignment tests to be conducted after all pipe has been installed and backfilled.
3. The observation test shall be conducted after all upstream work has been completed and the pipeline cleaned of debris.
4. Notify the Engineer at least 24 hours in advance of the proposed observation testing.
5. Introduce water into the sewer lines to be tested from the upstream manhole prior to the observation test but no more than 24 hours in advance of the test.
6. Beam a source of light, acceptable to the Engineer, through the pipeline from both ends and the Engineer will directly observe the light in the downstream, and/or upstream manhole of each test section.
7. The length of pipe between manholes, diameter of pipe and amount of light observed in the manhole at the end of each pipe section will determine acceptance of the alignment test by the Engineer.
8. The amount of vertical and horizontal deflection shall not be greater than the ASTM allowance and (manufacturer's recommendations) for the pipe being tested.
9. No standing water shall be allowed. The presence of standing water shall be cause for rejection of that pipe (including manhole) section.
10. Improper alignment will be corrected by re-excavation and resetting of pipe at no additional cost to the Owner.

E. Pipe Deflection: (Gravity Sewers)
1. Pipe provided under this specification shall be installed so there is no more than a maximum deflection of 5.0 percent. Such deflection shall be computed by multiplying the amount of deflection (normal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
2. The Contractor shall wait a minimum of 30 days after completion of a section of sewer, including placement and compaction of backfill, before measuring the amount of deflection by pulling a specially designed gage assembly through the completed section. The gage assembly shall be in accordance with the recommendations of the pipe manufacturer and be acceptable to the Engineer.
3. Should the installed pipe fail to meet this requirement, the Contractor shall do all work to correct the problem as the Engineer may require without additional compensation.

F. Television Inspection Tests (Gravity Sewers)
1. Where television inspection testing is required, test procedures shall be in compliance with the requirements outlined in Specification Section 02753.

2. No standing water shall be allowed. The presence of standing water may be cause for rejection of that pipe.
3. Any standing water, detectable leaks, improper joints or any other unacceptable feature detected by the television inspection will be corrected by re-excavation and resetting pipe at no additional cost to the Owner.

G. Inspection of Appurtenant Installations:
1. Completely inspect, at a time determined by the Engineer, all manholes and inlets to ascertain their compliance with the Drawings and Specifications.
2. Provide access to each manhole and inlet and check the following characteristics:
   a. Shape and finish of invert channels
   b. Watertightness and finish of masonry structures
   c. Location, type, and attachment of stops
   d. Elevation and attachment of frames, covers, and openings
   e. Pattern and machining of covers
   f. Drop connection arrangements

H. Manhole Leakage Testing:
1. Specified in the "Manholes, Covers and Frames" Section in Division 2.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cast-In-Place Concrete indicated on the Contract Drawings
B. Formwork
C. Concrete deformed reinforcement bars and accessories
D. CMU deformed reinforcement bars
E. Waterstops
F. Epoxy anchorage of reinforcement
G. Epoxy and expansion anchors are specified herein but shall be provided and installed under the specification sections wherein the items requiring such anchors are specified.

1.2 PRODUCTS INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

1.3 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

1.4 RELATED SECTIONS

A. Section 01340 - Submittals
B. Section 01400 - Quality Control
C. Section 03305 - Concrete Testing
D. Section 03346 - Concrete Finishing and Curing

1.5 REFERENCES

A. This section contains references that are applicable to this Specification Section. The applicable edition of the indicated references shall be the version that was the most current at the time of the Advertisement of Bids. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
B. AASHTO T 26 – Standard Method of Test for Quality of Water to Be Used in Concrete
C. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials
D. ACI 301 - Specifications for Structural Concrete
E. ACI 306.1 – Standard Specification for Cold Weather Concreting
F. ACI 306R – Guide to Cold Weather Concreting
G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary
H. ACI 355.2 – Qualifications of Post-Installed Mechanical Anchors in Concrete
I. ACI 355.4 – Qualifications of Post-Installed Adhesive Anchors in Concrete

J. ACI SP-66 – ACI Detailing Manual
K. ASTM A615/A615M – Standard Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement
L. ASTM A706/A706M – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
M. ASTM A775/A775M – Standard Specification for Epoxy-Coated Reinforcing Steel Bars
N. ASTM A1064/A1064M – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain or Deformed, for Concrete
O. ASTM A1094/A1094M – Standard Specification for Continuous Hot-Dip Galvanized Steel Bars for Concrete Reinforcement
P. ASTM C33/C33M – Standard Specification for Concrete Aggregates
Q. ASTM C40/C40M – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
R. ASTM C87/C87M – Standard Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
S. ASTM C88 – Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
T. ASTM C94/C94M – Standard Specification for Ready Mixed Concrete
U. ASTM C114 – Standard Test Methods for Chemical Analysis of Hydraulic Cement
V. ASTM C131/C131M – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Abrasion Machine
W. ASTM C150/C150M – Standard Specification for Portland Cement
X. ASTM C260/C260M – Standard Specification for Air Entraining Admixtures for Concrete
Y. ASTM C494/C494M – Standard Specification for Chemical Admixtures for Concrete
Z. ASTM C535 – Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Abrasion Machine
AA. ASTM C595/C595M – Standard Specification for Blended Hydraulic Cements
BB. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
CC. ASTM C881/C881M – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
DD. ASTM C989/C989M – Standard Specification for Slag Cement for Use in Concrete and Mortars
EE. ASTM C1240 – Standard Specification for Silica Fume Used in Cementitious Mixtures
FF. ASTM C1157 – Standard Performance Specification for Hydraulic Cement
GG. ASTM C1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
HH. ASTM C1293 – Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
II. ASTM C1567 – Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar Bar

Method)

JJ. ASTM C1602/C1602M – Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
KK. ASTM C1603 – Standard Test Method for Measurement of Solids in Water
LL. ASTM C1778 – Standard Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete
MM. ASTM D516 – Standard Test Method for Sulfate Ion in Water
NN. ASTM D4130 – Standard Test Method for Sulfate Ion in Brackish Water, Seawater, and Brines
OO. ASTM E329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
PP. AWS D1.4/D1.4M – Structural Welding Code – Reinforcing Steel
QQ. Concrete Reinforcing Steel Institute – 10MSP, Manual of Standard Practice
RR. Concrete Reinforcing Steel Institute - Placing Reinforcing Bars
SS. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstops
TT. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements

1.6 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301, ACI 117 and ACI 306.1 as modified here-in.
B. Expansion and epoxy anchors shall meet the following requirements:
    1. Expansion anchors shall be qualified for earthquake loading (use in cracked concrete) in accordance with ACI 355.2.
    2. Epoxy anchors shall be qualified for earthquake loading (use in cracked concrete) in accordance with ACI 355.4.
    3. Epoxy anchors installed shall be qualified in accordance with ACI 355.4 requirements for sensitivity to installation direction.
    4. Epoxy anchors shall be installed by personnel certified by an applicable certification program that includes written and performance tests in accordance with ACI/CRSI Adhesive Anchor Installation Certification program

1.7 SUBMITTALS

A. Submit layout drawings showing the location and extent of all waterstops, the type and size of all waterstops to be used and splice type, details and locations for each joint. Submit these layout drawings for review prior to the submittal of the reinforcement shop drawings and the start of concrete work.
B. Submit shop drawings for concrete and masonry reinforcement prior to fabrication, showing bar bends, details and placement and certified copies of Mill Test Reports for the reinforcement. Conform to ACI SP-66. Details shall include:
    1. Sizes, dimensions, and locations for reinforcement and supports
    2. Bending diagrams and schedules
    3. Splices
    4. Dowel Bar Splicers and Mechanical Bar Splicers: product data including strength tests

5. Cover and clearances
6. Class designation and details for bar supports
7. Pertinent reinforced concrete details with dimensions and elevations
8. Embedded items furnished by other trades and/or under other sections of the specification that are to be cast in concrete where interference with reinforcement may occur
9. Show reinforcement on: Plan views of slabs, wall elevations and sections, beam elevations and details. Provide plan details at wall intersections and openings.

C. Submit Concrete Mixture designs including field performance and/or laboratory test results which meet the criteria specified in ACI 301, Section 4. Mixture design shall include:
   1. Proportions for all ingredients, 28-day design compressive strength, water to cementitious materials ratio, admixture dosages, slump, air content and density.
   2. Cement Manufacturer's Certificates of conformance with ASTM C150/C150M or C595/C595M taken during the last 90 days.
   3. Supplementary Cementitious Materials: Source and test reports with certificates of conformance with ASTM C618 for fly ash and ASTM C989/989M for slag cement for actual material to be used in the Work taken during the last 90 days
   4. Aggregate: data not older than 90 days, except test data for soundness, abrasion, alkali reactivity – not older than 12 months. Fine and coarse aggregate data and test results shall include:
      a. Sources
      b. Specific Gravity
      c. Sieve analyses per ASTM C33/C33M, including fineness modulus of fine aggregate
      d. Organic impurities per ASTM C40/C40M (fine aggregate).
      e. Aggregate reactivity (fine and coarse aggregate), one of the following options:
         i. Aggregate test data in accordance with ASTM C1293,
         ii. Concrete mixture tests in accordance with ASTM C1567,
         iii. Categorized in accordance with ASTM C1778 with testing in accordance with ASTM C1293 at 1-year, or ASTM C1260 at 16-days if ASTM C1293 test data is not available. Also indicate the total alkali loading contributed by portland cement in the submitted mixture/s.
      f. Soundness per ASTM C88 tested with magnesium sulfate (fine and coarse aggregate).
      g. Abrasion per ASTM C131/C131M or ASTM C535 (coarse aggregate).
   5. Product data and material safety data sheets for concrete admixtures.
   6. Test reports by testing agencies meeting ASTM E329:
      a. Field test data used to determine the standard deviation used for establishing the required average design strength, and field test data documenting that the proposed concrete proportions will produce an

average compressive strength equal or greater than the required average compressive strength, shall be from within the previous 12 months.

b. Laboratory trial batch data shall be from with the previous 12 months.

D. Submit product data and material safety data sheets for concrete accessories.

E. Submit sample concrete mixture delivery slip that shall include the following information:

1. Serial number of ticket
2. Date and project location
3. Name and location of ready mixed concrete plant
4. Truck number, time loaded, cubic yards delivered
5. Mixture design
6. Quantities of admixtures, with brand names
7. Quantities and types of cement, fly ash and/or slag
8. Quantity of water including quantity of water withheld
9. Quantities of fine and coarse aggregate including moisture content, nominal maximum aggregate size
10. Quantity of water added subsequent to plant batching
11. Unloading time and location

F. Submit product data and material safety data sheets for form release agent.

G. Submit product data for epoxy adhesive anchors. Data shall include:

1. Material properties of anchors and epoxy adhesive
2. ICC-ES AC308 report
3. Allowable and ultimate loads of the anchor system
4. Storage requirements
5. Installation requirements including:
   a. Drilling method (diamond drill bit shall be prohibited)
   b. Drill bit diameter and depth of hole for each size anchor
   c. Hole cleaning procedure and required condition of hole
   d. Requirements for discarding initial discharge to ensure proper mixing
   e. Hole filling procedure
   f. Time period when anchor cannot be contacted or otherwise disturbed
   g. Gel and cure times as a function of temperature
   h. Installation temperature requirements for cartridges and base material

H. Submit product data and layout drawings for Architectural Form Liner and Rustication Strips.

I. Submit product data for form ties.

J. Submit product data with strength tests for dowel bar and mechanical bar splicers.

K. For conduit to be encased in concrete structures submit a conduit layout plan under Section 16050. The conduit layout plan shall be reviewed with no exceptions taken by the Engineer prior to submission of reinforcement shop drawings.

L. Submit methods to be used to protect the concrete during cold weather placements, as defined in Section 03346. The Engineer's review shall be for information only as the Contractor is responsible for the means and methods of protection of concrete placed during cold weather.

M. Submit methods to be used to protect the concrete during hot weather placements. The Engineer's review shall be for information only as the Contractor is responsible

for the means and methods of protection of concrete placed during hot weather.

1.8 PRE-CONCRETE MEETING

A. Engineer shall hold meeting after the concrete mixture design has been reviewed by the Engineer and more than 14 days prior to the first concrete placement to review concrete procedures.
B. Meeting Minutes: Engineer shall record minutes of meeting and distribute to attending parties, within 10 business days of meeting.
C. Attendance: General Contractor shall coordinate the attendance of the following parties: Contractor; concrete supplier; concrete subcontractor; admixture manufacturer and concrete pumping contractor. Engineer shall coordinate the attendance of the following parties: Structural Engineer, Independent Testing Laboratory and Engineer's Resident Project Representative.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Undamaged smooth form facing materials such as plywood, hardboard, metal and plastic that will produce a smooth form finish with fins and offsets not exceeding 1/8 inch. Surfaces shall be clean, free of scratches, mars and discolorations. The Engineer may reject formwork the Engineer deems to be unacceptable or that may produce concrete that will not meet the specified requirements including surface finish.
B. Steel: Minimum 16 ga. sheet, well matched, tight fitting, stiffened to resist loads without excess deflection.
C. Aluminum: Forms with unoxidized surfaces shall be pretreated with a calcium hydroxide and water paste followed by repeated water rinsing until hydrogen bubbles no longer form.
D. Chamfer Corners: Chamfer, Wood Strip Type; ¾" x ¾" minimum, maximum possible length.
E. Form Ties:
    1. Liquid retaining structures and backfilled walls of below grade rooms:
        a. Factory fabricated adjustable length assembly providing a minimum 1.5inch break back dimension with minimum 1 inch diameter tapered plastic cones on both sides of the wall to leave a uniform hole for patching. All ties require a tightly fitted waterstop washer at the midpoint.
        b. Factory fabricated adjustable length tapered assembly that is removed from the wall, and the hole plugged with an EPDM plug insert that is mechanically tightened with a stainless steel bolt. Upon completion of tightness testing of structure (as applicable), the holes are to be fully packed with a cementitious crystalline waterproofing grout struck flush at both wall faces. Similar systems that use plug inserts that don't include a bolt for mechanically tightening are not permitted.
    2. Non-liquid retaining structures: Snap-off type, galvanized metal, adjustable lengths designed to break back at least 1 inch from finished surface or ties as indicated above.

F. Form release agent: Non-staining colorless, compatible with finishes, and non-toxic for potable water and NSF 61 certified.
   1. StarSeal EF Bio-Release by Vexcon
   2. Q-2 Form Release by Unitex
   3. Seacord RA II by Concord Chemical

G. Architectural Form Liner:
   1. Material: Thermoformed rigid polymer alloy [Urethane elastomeric]
   2. Grade: Uni-Cast, Multi-Cast, Dura-Cast, Ultra-Cast
   3. Form liners for Textured Finish Concrete: Provide special forming materials to produce form surfaces with face design, texture, arrangement, and configuration as shown on drawings.
   4. Liners to accommodate form pressures to a maximum 1000 psf. Comply with manufacturer's recommendations for support of large or deep patterns which may deform under pressure
   5. Form Release agent: Form Release 7000
   6. Reveals: Reveal StiX
   7. Backup Strips: Expanded polystyrene foam strips provide additional support to prevent deflection of the form liner due to form pressures
   8. Pattern: [xxx] by Greenstreak

H. Rustication Strips by Symons Elasto-Tex Model Number 30757 or equal.

I. Form all exposed circular structures with circular or segmented wood or steel forms. If segmental forms are used the specified wall thickness and radius shall be maintained. Straight panels shall not exceed 2’-0” in width, and a maximum deflection angle of 3.5 degrees per panel joint. Circular structures (such as below grade slabs and fully buried tanks) not exposed to view may be formed with segmented panels that exceed the stated width and angle limits.

2.2 REINFORCEMENT

A. “Reinforcement” shall include all bars, anchorages, stirrups, dowels, ties, tie-wire, chairs and other steel supports, and spacers, as noted on the Contract Drawings, specified herein, and as required for the proper completion of the Work.

B. Bars: ASTM A615/A615M Grade 60; deformed new materials. Cold bent in accordance with CRSI 10MSP.

C. Welded wire fabric: ASTM A1064/A1064M. Flat sheets are required; rolls are not permitted.

D. Epoxy coated bars: ASTM A775/A775M.

E. Tie wire: ASTM A1064/A1064M, annealed. Provide epoxy coated for epoxy-coated reinforcement and galvanized for architectural concrete.

F. Bolsters, chairs, spacers and other supports to properly position reinforcement shall conform to the “Bar Support” recommendations of CRSI 10MSP and shall be of adequate strength and design to prevent displacement of reinforcement and discoloration of concrete. Where concrete surfaces are exposed to view, weather and/or moisture supports shall be Class 1 Plastic, Plastic Protected, or epoxy coated. Supports for bottom reinforcement for slabs placed on soil or on a mud mat with no more than 3 inches of cover shall be Class 3 chairs with integral plates or precast concrete blocks not less than 4 inches square.

G. Expansion Joint Dowel Bar: Type 316 stainless steel.

2.3 FABRICATION OF REINFORCEMENT

A. Conform to CRSI Code of Standard Practice-Fabrication.
B. Cold bend bars.
C. Bend bars around revolving collar of recommended size.

2.4 EXPANSION ANCHORS

A. Approved for use in cracked concrete in accordance with ACI 355.2.
B. Stainless steel AISI Type 316 for galvanized and aluminum fabrications; zinc-plated for painted steel fabrications.
    1. Hilti Kwik-Bolt TZ or Hilti HSL, by Hilti Fastening Systems
    2. Trubolt+ Wedge Anchor by ITW Red Head
    3. Power Stud+ by Powers Fasteners
    4. Strong-bolt 2, by Simpson Strong Tie Co.
    5. Or equivalent

2.5 EPOXY ADHESIVE ANCHORS

A. Includes epoxy anchor systems and epoxy adhesive for threaded rods and steel reinforcement.
B. Approved for use in cracked concrete in accordance with ACI 355.4.
C. Materials:
    1. Anchor: AISC Type 316 Stainless Steel threaded rod with washer and nut.
    2. Adhesive:
        a. Epoxy adhesive for anchoring reinforcement to concrete shall be a two-component solid epoxy-based system supplied in manufacturer's standard side-by-side cartridge and dispensed through manufacturer's standard static-mixing nozzle. Except for gel times, epoxy adhesive shall conform to ASTM C881. The Grade, Class and Type of epoxy shall be that which is appropriate for the intended use.

        b. Epoxy adhesive shall pass the creep test requirements of ICC-ES AC308.
        c. Acceptable manufacturers:
            i. SET-XP or ET-HP by Simpson Strong Tie Co., Inc.,
            ii. HIT-RE 500-SD or HIT HY-200 by Hilti, Inc.,
            iii. or equal.
D. Embedment depth for reinforcement: Unless otherwise indicated on the Drawings, the embedment depth shall be per the manufacturer's requirements such that:
    1. The ultimate strength exceeds the tensile strength of the bar.
    2. The ultimate strength divided by a minimum safety factor of 3.75 is at least 40 percent of the yield strength of the bar.

2.6 CONCRETE MATERIALS

A. Each cementitious material shall be furnished from one source throughout the Project.
B. Portland cement: ASTM C150/C150M; Type II.
C. Blended cements: ASTM C595/595M (MS) types, excluding type IS (≥70). Do not

use blended cements conforming to ASTM C595/595M if they contain cements conforming to ASTM C1157/C1157M.

D. Supplementary Cementitious Materials:
   1. Slag Cement: ASTM C989 - Grade 100 or 120.
   2. Silica Fume: ASTM C1240
   3. Fly Ash: ASTM C618 - Type F

E. Aggregates:
   1. Prohibited: crushed hydraulic cement concrete and recycled aggregate.
   2. Fine aggregate
      a. Shall meet FDOT requirements for structural concrete, or
      b. Shall consist of washed inert natural sand, free from mineral or other coatings, soft particles, clay, loam, organic or other deleterious materials conforming to the requirements of ASTM C33/C33M and the following requirements:

SIEVE NO.	PERCENT PASSING
4	95 to 100
8	80 to 100
16	50 to 85
30	25 to 60
50	5 to 30
100	0 to 10
200	0 to 3.0

   3. The Fineness Modulus shall be between 2.3 to 3.1. The percentage retained between any two consecutive sieves shall not exceed 45%.
   4. Coarse aggregate shall consist of a well graded crushed stone or a washed gravel conforming to the requirements of ASTM C33/C33M and the following requirements:

	PERCENT PASSING			
SIEVE	NO. 8 (3/8”)	NO. 67 (3/4”)	NO. 57 (1”)	NO. 467 (1 1/2”)
1-½ inch	-	-	100	95-100
1 inch	-	100	95-100	-
¾ inch	-	90-100	-	35-70
½ inch	100	-	25-60	-
3/8 inch	85-100	20-55	-	10-30
No. 4	10-30	0-10	0-10	0-5
No. 8	0-10	0-5	0-5	-
No. 16	0-5	-	-	-
No. 50	-	-	-	-

   5. The limits of deleterious substances and physical property requirements shall be as listed in ASTM C33/C33M, Table 4, for severe weathering regions.

6. Fine Aggregate testing: Perform the following tests on samples of the fine aggregate:
   a. Organic Impurities (ASTM C40/C40M):
      i. Color of supernatant liquid above test sample tested in accordance with ASTM C40/C40M shall not be darker than standard (Organic Plate No. 3/Gardner Color Standard No. 11).
      ii. Use of a fine aggregate failing when tested in accordance with ASTM C40/C40M is not prohibited if when tested in accordance with ASTM C87 the relative strength at 7 days is not less than 95%.
   b. Soundness (ASTM C88):
      i. Fine aggregate sample tested in accordance with ASTM C88 for five cycles using magnesium sulfate (not sodium sulfate) shall have a weighted average loss not greater than 18%.
   c. Alkali Reactivity:
      i. Use one of the following three options:
         (1) Test aggregate in accordance with ASTM C1293. Aggregate having an expansion less than 0.04% at 1-year is acceptable for use.
         (2) Test aggregate with the cementitious materials combination submitted in accordance with ASTM C1567. Aggregate having an expansion less than 0.10% at 16 days is acceptable for use.
         (3) Aggregate reactivity shall be categorized in accordance with ASTM C1778 with testing in accordance with ASTM C1293 at 1-year, or ASTM C1260 at 16-days if ASTM C1293 test data is not available. If the coarse and fine aggregates are of different reactivity, the level of protection shall be based on the more reactive aggregate. The alkali content contributed by the portland cement shall not exceed 4.0 lbs per cubic yard of concrete for moderately reactive aggregate and 3.0 lbs per cubic yard of concrete for highly reactive aggregate. The use of very highly reactive aggregate shall not be permitted.
      ii. Evidence of a satisfactory service record in lieu of testing for alkali reactivity is not permitted.
7. Coarse Aggregate testing: Perform the following tests on samples of the coarse aggregate:
   a. Abrasion (ASTM C131/C131M or ASTM C535):
      i. Coarse aggregate shall be tested in accordance with either ASTM C131/C131M (aggregate smaller than 1 1/2") or ASTM C535 (aggregate larger than ¾").
      ii. Loss of the mass of the coarse aggregate by abrasion shall not exceed 50%.
   b. Soundness (ASTM C88):
      i. Coarse aggregate sample tested in accordance with ASTM C88 for five cycles using magnesium sulfate (not sodium sulfate) shall have

a weighted average loss not greater than 15%.

c. Alkali Reactivity:
   i. Use one of the following three options:
      (1) Test aggregate in accordance with ASTM C1293. Aggregate having an expansion less than 0.04% at 1-year is acceptable for use.
      (2) Test aggregate with the cementitious materials combination submitted in accordance with ASTM C1567. Aggregate having an expansion less than 0.10% at 16 days is acceptable for use.
      (3) Aggregate reactivity shall be categorized in accordance with ASTM C1778 with testing in accordance with ASTM C1293 at 1-year, or ASTM C1260 at 16-days if ASTM C1293 test data is not available. If the coarse and fine aggregates are of different reactivity, the level of protection shall be based on the more reactive aggregate. The alkali content contributed by the portland cement shall not exceed 4.0 lbs per cubic yard of concrete for moderately reactive aggregate and 3.0 lbs per cubic yard of concrete for highly reactive aggregate. The use of very highly reactive aggregate shall not be permitted.
   ii. Evidence of a satisfactory service record in lieu of testing for alkali reactivity is not permitted.

F. Water:
   1. Potable from municipal water supply.
   2. Nonpotable water that meets ASTM C1602/C1602M and the following requirements:
      a. Chlorides as Cl: 1000 ppm - tested by ASTM C114 or by #4500, Argentometric Method from “Standard Methods for the Examination of Water and Wastewater”.
      b. Sulfate as SO4: 1500 ppm – tested by ASTM D516 or ASTM D4130.
      c. Equivalent alkalies (Na2O + 0.658 K2O): 300 ppm total alkali – tested by ASTM C114.
      d. Total inorganic solids by mass: 5000 ppm – tested by ASTM C1603.
      e. Organic solids by mass: 300 ppm – tested by AASHTO T 26.
      f. pH: 4.0 to 9.0 – tested by AASHTO T 26.
      g. Presence of oil: none to slight – by visual observation.
      h.

2.7 ADMIXTURES

A. Low Range Water Reducer: MasterPozzolith 210 by Master Builders/BASF; WRDA with HYCOL by GCP Applied Technologies; or equivalent meeting ASTM C494 Type A.

B. High Range Water Reducer (superplasticiser): Rheobuild 1000 or Glenium 3000 NS by Master Builders/BASF; Daracem 100 or ADVA 140M by GCP Applied Technologies; or equivalent meeting ASTM C494 Type F.

C. Water reducing-retarding agents: for use when ambient temperature is above 70°F,

replace water reducing agent in whole or in part with water reducing-retarding agent meeting ASTM C494 Type D. Use amounts to produce concrete with a set time equal to that at 70°F without the retarder.

D. Air entraining agent: MasterAir AE 200 by Master Builders/BASF, DAREX II AEA by GCP Applied Technologies; or equivalent meeting ASTM C260.

E. Non-corrosive non-chloride accelerator: MasterSet FP 20 by Master Builders/BASF; Polarset by GCP Applied Technologies; or equivalent meeting ASTM C494 Type C or E.

F. Cementitious Waterproofing: per Section 07100.

G. Not permitted: Calcium chloride, thiocyanates or admixtures containing chloride ions.

H. All admixtures used for each mixture design shall be from one single manufacturer.

2.8 ACCESSORIES

A. Expansion Joint Fillers (Expansion joints and slab isolation joints):
   1. For joints less than ½" thick: J-Joint polyethylene foam with tear off strip for sealant, or equivalent; joint filler to be slab thickness in depth less 0.5 inch for sealant. Foamtastic by Hohmann & Barnard Co., Stripoff by AH Harris, or equivalent.
   2. For joints ½" thick or greater: Self expanding cork by W.R. Meadows or Hohmann & Barnard Inc., or equivalent meeting ASTM D1752 Type III, size as indicated on the Drawings.

B. PVC Waterstops:
   1. PVC waterstops shall meet COE CRD-C 572 except:
      a. Tensile strength shall exceed 2,000 psi;
      b. Minimum ultimate elongation shall be 300 percent; and
      c. Shall be extruded virgin polyvinylchloride with no scrap, reclaimed material, or pigment, and
      d. Shall be either the flat ribbed type or wire reinforced flat ribbed type
   2. Flat Ribbed Type Waterstop:
      a. Construction and Control Joints *:* 3/8-inch thick by 6 inches wide. Type R638 by Vinylex Corporation, Style 679 by Sika Greenstreak, Type FR-6380 by Paul Murphy Plastics Company or equivalent.
      b. Containment curbs: 3/16 inch by 4 inches wide. Type R4-316T by Vinylex Corporation, Style 781 by Sika Greenstreak, Type FR-4316 by Paul Murphy Plastics Company, or equivalent.
      c. Expansion Joints: 3/8-inch thick by 9 inches wide with a center bulb. Type RLB938 by Vinylex Corporation, Type 696 by Greenstreak Plastics Products, Type CR-9380 by Paul Murphy Plastics Company or equivalent.
   3. Split Type Waterstop
      a. Construction and Control Joints: 3/8-inch thick by 9 inches wide. Type RSB938 by Vinylex Corporation, Style 727 by Sika Greenstreak, Type SR-9380 by Paul Murphy Plastics Company or equivalent.
      b. Expansion Joints: 3/8-inch thick by 9 inches wide. Style 727 by Greenstreak Plastics Products, Type RSB9-38 by Vinylex Corporation, Type SR-9380 by Paul Murphy Plastics Company or equivalent.

C. Surface applied waterstops (hydrophilic rubber type):
   1. Hydrotite CJ-1020-2K-ADH by Sika Greenstreak
   2. De Neef Swellseal Joint by GCP Applied Technologies
   3. Adeka Ultra Seal MC 2010
   4. Or equivalent

D. Surface applied waterstops (elastomeric adhered type):
   1. System shall consist of Polyolefin (FPO) sheeting strips adhered to the concrete with an epoxy resin. The hypalon strips shall be minimum 8 inches wide and minimum 2 mm thick. The hypalon rubber shall exhibit a minimum tensile strength of 1,000 psi in accordance with ASTM D412.
      a. Sikadur Combiflex SG Type 20-P
      b. Sikadur Combiflex SG Type 20-M – approved for drinking water contact
      c. Or equivalent

E. Waterstop Caulk (single component polyurethane water-swelling sealant):
   1. Leakmaster LVZ by Sika Greenstreak
   2. De Neef Swellseal WA by GCP Applied Technologies
   3. Adeka Ultraseal P-201
   4. Or equivalent

F. Retrofit Waterstop: 3/16" thick, "L"-shaped with a 3-inch long ribbed vertical leg and 3" long non-ribbed horizontal leg: Greenstreak 655 or equal. Stainless steel batten bars with pre-drilled holes 6" o.c. and approved stainless steel fasteners shall be provided. A bedding of epoxy recommended by the waterstop manufacturer shall be provided.

G. Dovetail anchor slots: 1 inch by 0.625 inch by 1 inch, 24 gage, stainless steel, 10-foot lengths, foam filled by Heckman Building Products, Hohmann & Barnard or equivalent.

H. Epoxy bonding agent:
   1. Two or three-part water-based epoxy
   2. Acceptable products:
      a. Armatec 110 EpoCem by Sika Corporation
      b. Corr-Bond by Euclid Chemical Company
      c. Epobond by L&M Construction Chemicals, Inc.
      d. MasterEmaco P124 by Master Builders/BASF
      e. or equivalent.

I. Cementitious bonding agent:
   1. Grout paint: 1 part portland cement, 1 part fine sand, water for consistency of thick paint

J. Structural inserts: of type and size shown on the drawings; Richmond Screw Anchor or Heckman Building Products, Hohman and Barnard, Dayton Sure-Grip or equivalent.

K. Bond Breaker: Thompson's Water Seal or equivalent, or form oil.

L. Expansion Dowel Caps (Plastic): No. 87 dowel Caps as manufactured by Heckmann Building Products, Inc., Type F-46 Dowel Caps by Dayton Superior, Speed Load by Greenstreak, or equivalent.

M. Cast-in-place Reglet: 26 gage minimum stainless steel. Type 304 "CO" concrete

reglet, foam filled with connector clips and flashing by Fry Reglet Corporation, #230 Standard Flashing Reglet by Heckmann Building Products or equivalent.

N. Expanded Coil Inserts. Minimum 4,000 lb min safe working load, minimum 4 ½" length. F-57 by Dayton Superior, CI-56 by Patterson, or equivalent. Required size to match inserted bolt.

O. Pressure Relief Valves (Flap Valve type)
   1. Valve type: 4" diameter flanged wall type.
   2. Materials:
      a. Valve body: Grey cast iron: ASTM A126 Class B or ASTM A48 Class 30. Flanges shall be drilled with ANSI 125# bolt pattern.
      b. Lid: Grey cast iron: ASTM A126 Class B or ASTM A48 Class 30.
      c. Hinge Pin: AISI Type 304 Stainless Steel or bronze.
      d. Seal: Buna-N Rubber.
      e. Wall pipe: Grey cast iron: ASTM A126 Class B or ASTM A48 Class 30. Flanges shall be drilled with ANSI 125# bolt pattern.
   3. Opening Pressure: Valve shall open with less than 1 foot of hydrostatic head.
   4. Acceptable Products:
      a. Trumbull Industries, Youngstown, Ohio
      b. Rodney Hunt Co. (Type FV-AC, FV-SPR or FV-ACP), Orange, Massachusetts
      c. Clow Valve Company, Oskaloosa, Iowa
      d. Neenah Foundry Company (R-5002 Series), Neenah, WI
      e. Or equal

P. Pressure Relief Valves (Duckbill type)
   1. Duckbill check valves shall be all rubber elastomer flexible check valves, suited for the application, exposure environment and compatible with the liquids they will be transporting.
   2. Duckbill check valves shall be designed to allow passage of flow in one direction while preventing reverse flow without mechanical moving parts.
   3. The valve shall have the following physical characteristics and flow rates:
      a. Inside diameter - 6 inches
      b. Maximum length - 15.625 inches
      c. Maximum backpressure without inversion - 40 psi
      d. Flow rate - At 1 foot head loss and 1 foot differential pressure head the flow rate through the valve is 140 gpm.
   4. The discharge end shall be formed with a closed slit that when closed is sealed tight and opens when the internal pressure exceeds external pressure allowing fluids to discharge through the deformed slit.
   5. The discharged end shall be formed to seal, preventing significant flow in the reverse direction even if some debris is lodged in the opening.
   6. The method of attachment of the elastomeric duckbill check valve to the discharge piping or structure shall be as indicated on the Drawings. The methods shall consist of:
      a. Integrally molded elastomeric flanged connection on the duckbill check valve with backup flanges to match bolted flanged connection on piping.
      b. Integrally molded elastomeric bolting flanged connection on the duckbill

check valve with backup flanges to attach directly to the discharge structure using expansion, epoxy anchors or through bolts.

c. Slip on friction or slight interference fit over discharge piping and be secured with clamping mechanism suitable to secure the duckbill check valve to the discharge piping when flowing at design maximum rate (maximum internal pressure) and constructed from materials suitable for maintaining strength in the installation environment. Typically, corrosion resistant SS metallic clamps or corrosion resistant non-metallic clamps such as PVC, FRP, Nylon, etc.

d. Flanges shall be attached to the concrete with type 316 stainless steel epoxy or expansion anchors.

7. Acceptable Products:
   a. Tide Flex Series 35-1, Red Valve Co. Inc., Carnegie, PA
   b. PROCO Series 700 ProFlex, Proco Products, Stockton CA
   c. Flex-Valve 4000 series Products, General Rubber, Carlstadt, NJ or Tucson, AZ
   d. Series DBS, ONYX Valve Company, Cinnaminson, NJ
   e. Or equal

2.9 CONCRETE CLASS

A. Class A: Reinforced structural concrete, garage floors, and exterior (non-structural) slabs-on-ground
B. Class A without coarse aggregate: Sand Cement Slurry
C. Class B: Concrete fill, pipe encasements
D. Class C: Interior (non-structural) slabs-on-ground (except garage floors), interior slabs placed on metal deck, topping for prestressed precast concrete, electrical duct banks, mud slabs

2.10 CONCRETE MIXTURE DESIGN

A. Concrete class:
   1. Class A: f'c = 4,500 psi, max w/cm = 0.42, min w/cm = 0.39
   2. Class B: f'c = 4,000 psi, max w/cm = 0.45
   3. Class C: f'c = 3,500 psi, max w/cm = 0.50
B. Maximum nominal aggregate size:
   1. Coarse aggregate shall conform to the grading given in Table 3 of ASTM C33/C33M for sizes (i.e., nominal maximum aggregate sizes) No. 467 (1 ½"), No. 57 (1"), No. 67 (3/4"), No. 7 (1/2"), and No. 8 (3/8").
   2. Nominal maximum aggregate size shall be as follows:
      a. 1 ½": All slabs placed on ground, foundation mats and footings, and walls that are at least 15 inches thick, except where the clear spacing between reinforcement bars is less than 2 inches.
      b. ¾": All other locations, except as specified elsewhere or upon written approval of the Engineer.
      c. Concrete Fill:
         i. ½": minimum thickness less than 2 ¼ inches and fills screeded into place by process equipment,
         ii. ¾": minimum thickness from 2 ¼ inches to less than 6 inches,

iii. 1 ½": minimum thickness of 6 inches or greater

d. Electrical Ductbanks: 3/8"

e. Topping of prestressed precast concrete plank specified in Section 03415: 3/8" or ½"

f. Mud slab: 3/8", ½" or ¾"

C. Air entrainment:

1. All concrete, except as noted below, shall be air entrained in accordance with the nominal maximum aggregate size, with a tolerance of plus or minus 1.5%:
   a. No. 8 (3/8") – 7.5%
   b. No. 7 (½") – 7.0%
   c. No. 67 (¾") – 6.0%
   d. No. 57 (1") – 6.0%
   e. No. 467 (1 ½") – 5.5%
2. Interior concrete slabs to be hard troweled shall have a maximum air content of 3.0% and shall be provided with long-term cold weather protection as specified in Part 3.

D. Supplementary cementitious materials may be included as follows.

1. Portland Cement - No less than 50% of the total by weight.
2. Slag Cement - If used, no less than 25% and no greater than 35% of the total by weight.
3. Silica Fume –If used, no less than 5% and no greater than 10% of the total by weight.
4. Fly Ash - If used, no less than 15% and no greater than 25% of the total by weight.
5. Total Fly Ash + Slag + Silica Fume – No greater than 50% of the total by weight.
6. Total Fly Ash + Silica Fume – No greater than 35% of the total by weight.

E. The slump shall be 4" with a 1" plus or minus tolerance at the point of delivery, without use of a high range water reducer. When a high range water reducer is used, the slump shall be as stated above before it is added, and a maximum of 8" at the point of delivery after it is added.

F. Water:

1. The amount of water carried on the aggregate and the effect of admixtures is included in the water content. Provide that water carried on the aggregate is determined periodically by test and the amount of free water on the aggregate is subtracted from water added to the mixture.
2. Maximum amount of water: that required to produce a plastic mixture of the strength and water to cementitious materials ratio specified and the required density, uniformity and workability. Consistency of the mixture: that required for the specific placing conditions and methods.

G. High Range Water Reducing admixtures shall be used for all concrete to be pumped or with a specified water to cementitious ratio below 0.50. High range water reducer shall be added either at the concrete batch plant or on site to obtain the slumps as indicated above.

H. Concrete shall be furnished from one supplier and batch plant during the project.

2.11 SELECTION OF CONCRETE PROPORTIONS

A. The Concrete producer shall select the concrete mixture proportions on the basis of past field performance or the use of trial mixtures, both in accordance with ACI 301, Section 4, "Concrete Mixtures".

B. Adjustments to required average strength (f'cr):

1. Adjustments in the required average strength may be made during the progress of the work to compensate for either high or low average compressive strengths.
2. When a minimum of fifteen 28-day compressive strength tests from this project are available, the average strength and standard deviation shall be computed.
3. Should these determinations indicate an excessive compressive strength with a low standard deviation as determined by the Engineer, modification of the concrete mixture may be made to achieve a lower average strength based upon a new standard deviation.
4. Should these determinations indicate a lower average strength than anticipated, the Engineer will require corrective measures to be taken immediately which may include one or more of the following but not limited to:
   a. An increase in the cementitious materials
   b. Changes in mixture proportions
   c. A reduction in the delivery time
   d. Closer control of air content.
   e. Decrease in the water to cementitious materials ratio.
   f. An improvement in the quality of the testing, including strict compliance with standard test procedures.
   g. Procedural changes as deemed necessary by the Engineer.

2.12 STORAGE OF MATERIALS

A. Protect materials from ground and the elements.
B. Maintain cement in dry condition.
C. Store reinforcement and all other embedded items on skids.
D. Store PVC waterstops in a location that is protected from sunlight, precipitation, soiling, etc. Keep surface applied waterstops dry.
E. Remove defective materials, as determined by the Engineer, from site immediately. Do not store on site.

PART 3 - EXECUTION

3.1 FORMWORK

A. Conform to ACI 301.
B. Verify lines, level, and measurements before proceeding.
C. Erect plumb and straight. Maintain rigid. Brace sufficiently.
D. Allow no concrete leakage. Provide continuous, straight, smooth exposed surfaces.
E. Treat forms with form release agent prior to erecting forms. Do not apply form release agent at formed surfaces of construction joints designed with continuous reinforcement and remove all traces from formed joint prior to subsequent concrete

placement. Protect reinforcement from contact with form release agent. Form release agent that contacts reinforcement shall be thoroughly removed.

F. Earth forms not permitted for below grade walls, slabs and footings.
G. Camber formwork as necessary.
H. Provide removable wall panels to allow cleaning and inspection.
I. Chamfer all exposed outside corners and edges 0.75 inch unless otherwise noted.
J. Clean out inside of forms of all foreign materials prior to concrete placement.
K. Install architectural form liner and rustication strips according to Manufacturer's recommendations.
L. Install reinforcement spacers in slabs, beams, walls, columns, and all other concrete members as required to maintain specified clear cover.
M. Maintain specified tolerances.
N. Maintain forms and shores supporting the cast concrete for the minimum time periods indicated below:
    1. Walls and Vertical Surfaces:
        a. Walls containing liquids (subjected to internal hydrostatic pressure) and backfilled walls of interior spaces - 48 Hours
        b. All other walls – 36 hours
        c. Forms may be unlocked after 24 hours but shall remain in place for the indicated time periods
    2. Elevated Beams and Slabs :
        a. “Clear span” of slabs shall be the shorter span of a slab panel.
        b. Clear spans less than 10 feet – 4 days
        c. Clear spans between 10 feet and 20 feet – 7 days
        d. Clear spans greater than 20 feet – 14 days
    3. Time periods listed above represent cumulative number of days or hours during which the temperature of the air surrounding the concrete is above 50°F and the concrete has been damp and no loss of moisture has occurred.
    4. Alternate form removal periods:
        a. Alternately to the stripping times specified above, additional concrete cylinders may be made of representative concrete, field-cured, and tested at no additional cost to the Owner.
        b. The supporting forms and shores may be removed when the concrete strength of the field-cured cylinders, as tested per ASTM C39/C39M is a minimum of 70 percent of the specified design strength.
        c. General Contractor shall notify the Engineer 24 hours in advance of casting the field-cured cylinders.
        d. Field-cured cylinders - where noted on the plans and/or when used by the Contractor, specimens shall be field-cured in accordance with ASTM C31/C31M under conditions that are not more favorable than the most unfavorable conditions for the portions of the concrete that the test specimens represent.
O. Reshore as required.
P. Form pressures increase with the use of concrete with High Range Water Reducers. Design forms accordingly.
Q. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated

or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form release agent as specified for new formwork.

R. Form Liners:
   1. Form Liner Preparation:
      a. Before placing concrete, verify that lines and levels of formwork and form liner patterns are within allowable tolerances.
      b. On multiple use liners, clean liner before each use. Replace damaged liner whose continued use or repair would negatively impact the aesthetics of the concrete finish.
      c. Apply form liner compatible release agent at rate recommended by manufacturer. Attempt to schedule concrete pour soon after application of release agent to avoid precipitation, dust, and debris. Protect reinforcement from exposure to release agents.
   2. Form Liner Installation:
      a. Seal form liner joints, form liner accessories' joints, and tie holes to prevent cement paste from bleeding.
      b. Provide solid backing at form liner butt joints to prevent deflection.
      c. Miter cut form liners as required at corners to continue pattern around corners. Caulk any gaps between the adjacent form liners at corners to prevent concrete getting past the liners.
      d. Construct form liner and accessories to sizes, shapes, lines and dimensions shown.
      e. Provide openings, offsets, keyways, recesses, chamfers, blocking, and screeds as required to achieve architectural concrete textured finish.
      f. Drill or pierce liner to accommodate form ties.
      g. Anchor liner to form on centers not to exceed 18 inches. Decrease centers as necessary to accommodate form stripping pressures without damaging liner intended for multiple use.
      h. Install backup strips as required to prevent deflection of the liner due to form pressures.
   3. Concrete Placement:
      a. Form pressures shall not exceed the maximum pressures recommended by the form liner manufacturer.
      b. Keep concrete lifts less than 24 inches. Thoroughly vibrate concrete to achieve good consolidation, and eliminate entrapped air thereby minimizing voids. Internally vibrate through to previous lift to avoid lift lines. Avoid vibrator contact with the form liner.
   4. Form Liner Accessory Installation:
      a. Form rustication lines located as indicated by nailing rustication strips to formwork within specified tolerances.
      b. Tightly form corners indicated to have chamfers with [rounded] [triangular] PVC chamfer strips. Corners with chamfers shall be smooth, continuous lines that are uniformly straight.

3.2 REINFORCEMENT

A. Conform to the CRSI Code of Standard Practice.
B. Do not weld reinforcement unless the Engineer takes no exceptions - in writing.

When permitted, welding shall be in accordance with AWS D1.4/D1.4M.

C. Splicing reinforcement:
   1. Welded wire fabric: Install in longest sheets practical. Welded wire fabric shall be lapped 1½ wire spacings and a minimum of 12 inches and securely tied at maximum 24 inches on center. Offset end laps in adjacent sheets.
   2. Reinforcement bars: Splices shall be located as shown on the Contract Drawings. Where not shown, splices shall be located away from areas of maximum stress, and shall be reviewed, with no exceptions taken, by the Engineer. Minimum splice lengths shall be as indicated on the Contract Drawings.

D. Provide bar supports and spacers.

E. Reinforcement shall be securely tied at intersections with tie wire or clips in a manner that will keep all metal away from exposed concrete surfaces.

F. Cutting, heating, and bending of reinforcement embedded in the concrete will not be allowed.

G. Mechanical connections shall be installed in accordance with the manufacturer's recommendations and as shown on the Drawings. Additional mechanical connections proposed by the Contractor will not be allowed unless the Engineer has reviewed and takes no exceptions in writing.

H. Epoxy coating damaged shall be repaired with patching material conforming to ASTM A775/A775M.

I. All parts of mechanical connections on epoxy coated reinforcement, including steel splice sleeves, bolts and nuts shall be coated with the same material used for repair of epoxy coating damage.

J. All reinforcement within an area of a continuous concrete placement shall be installed, supported, and secured before beginning concrete placement.

3.3 EMBEDDED ITEMS

A. Contractor shall coordinate the installation and securing of all embedded items such as anchor rods, dovetail slots, waterstops, pipes, conduit, pipe hanger inserts, nosings, embedded angles, steel dowels and all other required embedded items indicated in the Contract Documents.

B. Expansion joint dowels shall be held horizontally in forms to prevent displacement and to allow at least one inch of expansion after installation.

C. Contractor shall coordinate number and layout of masonry dowels with the mason prior to installation.

D. All embedded items shall be secured prior to concrete placement. Embedded items shall not be placed during or after concrete placement.

E. Pipes or conduits for embedment within a slab, wall or beam, other than those merely passing through, shall satisfy the following:
   1. Shall not be larger in outside diameter than one-third (1/3) the thickness of the slab, wall, or beam.
   2. Shall not be spaced closer than 3 diameters on center.
   3. Shall not significantly impair the strength of the concrete.
   4. Shall not be embedded in structural concrete slabs less than 6 inches

5. Only two conduits or pipes shall cross at any point. The sum of the outside diameter of the crossing pipes or conduits shall not exceed one-third (1/3) of the thickness of the concrete thickness.
6. Conduit shall not be located between the bottom of reinforcement and bottom of concrete slab or beam.
7. Aluminum conduit shall not be embedded in concrete.
8. Conduit shall be installed such that there will be NO cutting, bending, and/or displacement of reinforcement from its proper location.
9. Conduit and/or pipes shall not pass through a waterstop in slabs, beams, or walls.
10. Conduit shall not be installed prior to review of conduit layout plan with no exceptions taken by the Engineer.
11. Voids cast into concrete slabs and walls for pipes or conduit and subsequently filled with concrete or grout shall not be installed unless reviewed with no exceptions taken by the Engineer.

3.4 WATERSTOPS

A. Waterstops shall be continuous throughout and around all corners and intersections. For PVC waterstops, use factory fabricated intersections such as corners, tees, and crosses. Bending waterstop around corners will not be acceptable.

B. PVC waterstop splices in the field shall be straight butt type. Splices shall be heat fused welded using a Teflon coated thermostatically controlled waterstop splicing iron at 380 °F in accordance with the manufacturer's recommendations. Unacceptable field splices include the following:
   1. Tensile strength less than 80% of the parent section.
   2. Misalignment of centerbulbs and ribs more than 1/16 inch, or that reduces cross section by more than 15%.
   3. Visible porosity, bubbles, or inadequate bonding. If while prodding the joint with a penknife the knife breaks through the outer portion of the weld into a bubble.
   4. Visible signs of splice separation when cooled splice is bent by hand at a sharp angle, including bond failure greater than 1/16-inch depth.
   5. Combined misalignment and bond failure with net cross section reduction of more than 15%.
   6. Charred or burnt material.
   7. Edge welded tee intersections.

C. Install PVC retrofit waterstops in accordance with the manufacturer's instructions.
   1. Grind or shot blast concrete surface to receive waterstop.
   2. Apply approximately 1/8-inch thick epoxy bed that is slightly wider than waterstop.
   3. Place waterstop in epoxy bed prior to epoxy cure and secure waterstop to substrate with stainless steel batten bars and approved stainless steel anchors 6 inches on centers.
   4. Fasten projecting leg of waterstop to reinforcement with wire ties every 12 inches to prevent folding, prior to placement of concrete.

D. All waterstops shall have 2 inches of concrete cover where designated to terminate.

E. Center PVC waterstop in joint and secure in correct position with hog rings or

grommets spaced 12 inches apart along both edges of waterstop and wired to adjacent reinforcement prior to concrete placement.

F. Pressure wash or otherwise clean PVC waterstop of all dried concrete splatter from previous concrete placements.
G. Hold PVC waterstop rigid with split bulkhead forms at all joints.
H. Installation of surface applied waterstops:
    1. Surfaces to receive surface-applied waterstop shall be cleaned of all debris.
    2. Apply primer in accordance with manufacturer's recommendations and install surface-applied waterstop.
    3. Surface applied waterstops shall be positioned such that the concrete edge distance on each side of the waterstop is equal to or exceeds the manufacturer’s minimum requirements.
    4. Protect waterstop from submerged or extended contact with water.
    5. Hydrophilic rubber waterstops are to be applied using integral adhesive backing or are to be pressed into a continuous bead of waterstop caulk.
I. Waterstop caulk shall be applied in a minimum 3/8” diameter continuous bead to cleaned concrete surface in accordance with the manufacturer’s recommendations. Protect from contact with water.
J. Place concrete uniformly to avoid displacing waterstop.
K. Thoroughly vibrate concrete around waterstop to avoid honeycombing and voids in concrete and to ensure complete contact between waterstop and concrete.

3.5 EXPANSION ANCHORS AND EPOXY ADHESIVE ANCHORS

A. Anchors shall be installed by qualified personnel trained to install expansion and adhesive anchors.
B. Anchors shall be installed in strict accordance with the Manufacturer’s Printed Installation Instructions (MPII).
C. Each installer shall at all times have in their possession the MPII.
D. Adhesive anchors shall be installed in concrete having a minimum age of 21 days at time of installation.
E. All adhesive anchor cartridges shall have the expiration date clearly visible. Material past its expiration date shall not be used and shall be immediately removed from the site.
F. Embedded reinforcement shall be located with proper equipment prior to drilling to ensure that each drilling location does not coincide with existing reinforcement. Drilling through reinforcement shall be prohibited.
G. If existing reinforcement is encountered while drilling, offset the drill hole by a maximum of 2-inches. The new relocated hole shall be in the same line as the line of drilled holes. All offset holes shall be a minimum of 4-inches from a free concrete edge. Maintain the original spacing locations of the remaining dowels as indicated on the Contract Drawings.
H. Diamond drill bits shall not be permitted. Hammer drills shall be used.
I. The initial material extruded from each adhesive anchor cartridge shall be discarded in accordance with the manufacturer’s instructions to ensure that all material is properly mixed.
J. Depth stop shall be used to ensure correct drilling depth. Drilled holes shall be blown out with air, thoroughly wire-brushed with a repeated back and forth

movement, blown out, thoroughly wire-brushed, and blown out again. Adhesive shall be injected starting from the bottom of the hole, and slowly withdrawn as filling progresses to prevent air pockets.

K. Anchored reinforcement shall remain completely undisturbed between manufacturer's specified gel time and the full cure time. Zero load shall be applied during this time.

3.6 PLACING CONCRETE

A. Notify Engineer and Independent Testing Laboratory 24 hours minimum prior to each placement.

B. All reinforcement within the area of one day's concrete placement shall be tied in place, and observed by the Engineer, prior to commencing concrete placement.

C. All concrete delivery trucks at each placement shall be tested as specified in Section 03305.

D. Assure placement and proper location of all embedded items.

E. Provide concrete Delivery Slip prepared at batch plant with each truck load of concrete showing the information listed under Submittals in this Section.

F. Water: water added after batching shall be carefully monitored as follows:

1. Residual, wash, and/or other water in drums: completely discharge prior to concrete batching (drums backed out).
2. Slump adjustment: not permitted at wash down, "slump rack", or by any other means between the time of batching to the point of delivery at the Project site.
3. Water added after arrival at Project site: accurately metered and recorded on the delivery ticket. The Engineer's Resident Project Representative shall be notified prior to the addition of water.
4. No additional water shall be added to the concrete on site that will increase the water to cementitious materials ratio above that specified. If additional water is to be added on site, it shall be held back during batching from the quantity specified in the mixture design. The amount of water held back shall be clearly indicated on the concrete delivery slip, and the addition of more water than indicated shall be cause for non-compliance and rejection of the concrete truck.

G. Place concrete from mixing truck to final location quickly and without segregation.

H. Place all concrete from the delivery truck within 90 minutes of addition of water to cement, or cement to aggregate, whichever occurs first. When air temperature is 90°F and above, this time shall be reduced to 60 minutes. These times may be exceeded only upon review with no exceptions taken by the Engineer, and only if all tests for air content, slump and temperature are also within specified limits.

I. Standing water shall be removed from all forms and excavations and the Work shall be kept dry during concrete placement. No water shall be thrown on, allowed to flow over, or rise upon the concrete until the concrete surface has reached its final set and is rigid.

J. Runways shall be provided for wheeled concrete handling equipment. Runways shall not be supported upon placed reinforcement.

K. Concrete truck chute shall conform to the following:

1. Minimum slope: 3 horizontal to 1 vertical. Maximum slope: 2 horizontal to 1 vertical. Between these limits the chute slope shall be such to ensure continuous flow without segregation.
2. Provide baffle at end of chute to prevent segregation. If the end of the chute is more than 3 feet above the surface of deposit, a spout is to be used. The spout is to be kept full of concrete with the end kept as near as practical to the surface of the deposit.
3. The chute shall be steel or steel lined. Aluminum chutes are not permitted. Sections of the chute shall have the same slope throughout.
4. The chute is to be thoroughly flushed with water before and after each use with the water discharged outside the forms.

L. Freefall from concrete truck discharge chute, pump hose and hopper hose: 4 feet maximum.

M. The accumulation of concrete on the forms and/or reinforcement above the level of placement shall be avoided. The splashing of concrete upon formwork that is set for a subsequent concrete placement shall be prevented due to the resulting marks on the finished concrete.

N. Concrete placements shall be carried out in a continuous operation until the placement of the entire section between construction joints is complete. Place against plastic concrete only.

O. Do not place partially hardened concrete. Re-tempering is not permitted.

P. Compacting and vibrating concrete:
1. Consolidate each layer by mechanical internal vibrating equipment supplemented by hand spading, rodding, and tamping as required. The depth of each layer shall not exceed the smaller of 20 inches and the depth that can be properly vibrated with the equipment used. When deposited in multiple layers, the vibrator shall penetrate the preceding layer approximately 6 inches to blend layers. Ensure that initial setting of the previous layer doesn't occur prior to placement of subsequent layer.
2. Do not use vibrator to move fresh concrete within the forms. Insert vibrator at approximately 18-inch intervals, and over-vibration resulting in segregation shall be prevented.
3. Concrete shall be thoroughly consolidated around reinforcement, embedded items and into corners of forms.
4. Ensure that vibrator is kept several inches clear of waterstops.
5. Where internal vibration is impractical, the use of form vibrators will be considered, and will be allowed only with the review with no exceptions taken by the Engineer. When allowed, the vibrator shall be placed so that motion is horizontal.
6. Vibratory screeds are acceptable for slabs up to 8 inches thick, however internal vibration is required in areas of load-transfer dowels and electrical conduit. Internal vibration is required for slabs thicker than 8 inches.

Q. Placing concrete in cold weather:
1. Conform to ACI 306.1 for concrete placements in cold weather as defined in Section 03346. When freezing temperatures may occur during periods not defined as cold weather, concrete surfaces shall be protected against

temperatures lower than 35 degrees, as measured by the Engineer, for at least the first 24 hours after placement.

2. Concrete shall conform to the following temperature limitations “as placed and maintained” and “as mixed”, respectively. The minimum temperature maintained shall be for a minimum of 6 days, or 4 days with use of an accelerator, and shall be as measured at the concrete surface by the Engineer:

		Concrete Thickness			
Item	Air Temperature	Less than 12 in	12-36 in	36-72 in	Greater than 72 in
Minimum concrete temperature as placed and maintained					
1	--	55°F	50°F	45°F	40°F
Minimum concrete temperature as mixed for indicated air temperature					
2	Above 30°F	60°F	55°F	50°F	45°F
3	0 to 30°F	65°F	60°F	55°F	50°F
4	Below 0°F	70°F	65°F	60°F	55°F

3. The concrete placement temperature shall not be higher than the minimum concrete placement temperature (in the table above) by more than 20°F.
4. An accelerator may be used in the mixture design when placing concrete in air temperatures below 50°F.
5. All material and equipment required for cold weather placement, protection and curing shall be available at the project site before commencing concrete placement.
6. Any enclosure for weather and climate protection shall be in place before depositing any concrete. Heating within the enclosure shall maintain the temperature specified with a reasonable degree of uniformity in all parts of the enclosure. All exposed concrete surfaces within the enclosure shall be kept sufficiently moist to prevent drying. Heating appliances shall not be placed in a manner so as to damage the enclosure, forms, supports, or expose any area of concrete to drying out or to excessive temperatures.
7. The use of direct fired heaters including salamanders and torpedoes is not permitted due to the potential damage to concrete surfaces exposed to elevated levels of carbon dioxide, which can result in soft, chalky surfaces and dusting throughout the life of the structure. Heaters shall be indirect fired heaters with combustion exhaust vented outside the enclosure.
8. All snow, ice and frost shall be removed from the surfaces against which the concrete is to be placed including subgrade and reinforcement.
9. Do not place concrete on frozen ground. Insulate or heat subgrade to ensure temperature of subgrade material is above 32°F when concrete is placed.
10. All embedded items having a cross sectional area of 1.00 square inches or greater, including #9 and larger steel reinforcement, shall be at a temperature not less than 10°F at time of concrete placement.
11. Cover, insulate and/or heat as required to protect concrete and provide frost protection beneath structure. Thermal protection shall be provided immediately after concrete placement. Except when supplemental heat is

provided, the R-value of the insulation shall be per the recommendations of Chapter 9 of ACI 306R.

R. Long-term cold weather protection of non-air-entrained hard troweled concrete slabs:
   1. After the curing period (at which time they are protected), the surface temperature shall be maintained at a minimum of 35°F for a minimum of 8 weeks.
   2. Thereafter, and for the duration of the Contract, if such slabs might be subjected to freezing temperatures they shall be fully sheltered from rain, snow, and all other water sources.
   3. The surface temperature shall be as measured by the Engineer.

S. Placing concrete in hot weather:
   1. Hot Weather: Job-site conditions that accelerate the rate of moisture loss or rate of cement hydration of freshly mixed concrete, including an ambient temperature of 80°F or higher, and an evaporation rate that exceeds 1 kg/m2/h.
   2. Temperature of concrete when placed shall not exceed 90°F. When the air temperature is 90°F and above, procedures to cool mixture ingredients shall be employed. These include:
      a. Providing shaded storage for aggregate,
      b. Frequent sprinkling or fog spraying of coarse aggregate,
      c. Using chilled batch water and/or ice.
   3. Forms and reinforcement shall be sprinkled with cold water just prior to concrete placement. When possible, placement of slabs should be scheduled accordingly in order to minimize problems associated with direct sunlight and/or drying winds.

T. Pumping: The inside diameter of pipes and hoses used to convey the concrete shall be a minimum of three times the maximum size aggregate of the mixture. In order to minimize altering the concrete properties, long vertical sections at the end of the pump line is prohibited. A horizontal hose run, a hose loop, or a slide gate at the end of the hose is to be used to reduce loss of entrained air.

U. Thoroughly moisten subgrade materials prior to placing slabs on grade.

V. Place one inch of Sand Cement Slurry prior to placing concrete at the bottom of all walls greater than or equal to 8 feet in height.

W. When placing new concrete directly against existing concrete, clean the surface of all contamination and debris, and roughen by steel shot-blasting, abrasive (sand) blasting, or water-jetting (hydrodemolition). Use of scabblers, scarifiers, bush hammers, or pneumatic hammers is not permitted. The prepared surface shall be water-saturated for a minimum of six hours, and the excess water shall be removed immediately prior to placement of concrete. Apply specified bonding agent to the prepared surface to bond to new concrete.

X. Provide concrete pads and foundations for all equipment as shown on Drawings or as required by the equipment manufacturer. Set anchor bolts for equipment with templates at correct elevations using manufacturer's shop drawings reviewed by the Engineer with no exceptions taken unless otherwise indicated. All equipment pads shall be sized by the Contractor and equipment supplier except as otherwise

indicated on the Drawings.

Y. Contractor shall coordinate concrete truck wash-out area with Owner.

3.7 JOINTS

A. Saw cut joints:
   1. Early-entry dry-cut saws shall be used unless otherwise permitted in writing by the Engineer. Sawing shall be performed as soon as the concrete has hardened sufficiently to prevent dislodgment of aggregates and edge raveling – normally between 1 and 4 hours after finishing. When use of wet cut saws is permitted, sawing shall be completed within 8 hours of concrete placement. Preformed embedded control joint strips may be used in lieu of saw cutting.
   2. The depth of saw cut joints shall be as indicated on the Contract Drawings.
   3. If a crack forms in the slab, propagating from the end of the partially completed sawed joint, the Contractor shall stop sawing the joint. The Contractor shall route out the crack in a concave configuration and fill the routed crack with the specified joint filler. Routing need not occur immediately.
   4. Concrete sawing machines shall be adequate in number and power, and with sufficient replacement blades to complete the sawing at the required rate. Joints shall be cut to true alignment and shall be cut in sequence of concrete placement. Sludge and cutting debris shall be removed.
   5. Temporary plastic joint inserts shall be provided in order to prevent spalling where joints intersect.
   6. Prior to completion of joint filler installation, sawed joints shall be protected against edge spalling due to any and all traffic and/or work occurring on the slab.
   7. Provide sawed joints only where shown on the drawings or as otherwise approved after written request.

B. Install PVC waterstops in joints in all liquid containing structures and below grade walls adjacent to interior spaces, unless otherwise shown on the Drawings. The waterstop shall extend the entire length of the joint and shall be positioned across the center of the joint.

C. Install PVC waterstops in all joints at containment curbs unless otherwise shown on the Drawings.

D. Apply bondbreaker to surface of control joints.

E. Install keys as indicated. Provide a minimum 2" clearance between edge of key and reinforcement.

F. Prepare joints as follows:
   1. Horizontal joints: remove laitance immediately after initial set and roughen surface in an acceptable manner that exposed the aggregate uniformly and doesn't leave laitance or loose aggregate. After the concrete has set to a stiffness that precludes laitance removal by shovels or scrapers, the Contractor shall remove it and create a roughened surface by water-jetting or other effective method. The use of pneumatic hammers is not permitted.
   2. Vertical joints: the surface shall be thoroughly cleaned of laitance by water-jetting or wire-brushing followed by air blasting.

3. Before concrete is placed against set concrete, the surface shall be thoroughly wetted with standing water removed. Horizontal construction joints shall be in a saturated surface dry condition: saturated for a minimum of 6 hours, with standing water removed.

3.8 TOLERANCES

A. Tolerances shall conform to all requirements of ACI 117.

3.9 FAILURE TO MEET STRENGTH REQUIREMENTS

A. The strength of the concrete in place will be considered substandard if any one of the following results occur (where a strength test is defined as the average of two 6"Ø x 12" cylinders or three 4"Ø x 8" cylinders):
   1. The average any three (3) consecutive strength tests at 28 days is less than the specified strength (f'c).
   2. A compressive strength test result falls below the specified strength (f'c) by more than 500 psi.

B. Concrete which fails to meet the strength requirements as outlined above will be reviewed by the Engineer. The Engineer will determine whether the substandard concrete will be accepted, rejected or additional tests performed.

C. When substandard concrete occurs as defined in Part A, the Engineer will require corrective measures to be taken immediately to increase the average of subsequent strength tests. In addition, the Engineer may require cores drilled in the area of question in accordance with Specification 03305. If the core tests are inconclusive or impractical to obtain, load tests may be required, and their results evaluated in accordance with ACI 318. If the average of the three cores is less than 85% of the specified strength or if one core is less than 75% of the specified 28-day strength, then that portion of the structure shall be strengthened by a method proposed by the Contractor and no exceptions taken by the Engineer or replaced by the Contractor at no additional cost to the Owner.

3.10 DEFICIENT CONCRETE

A. Concrete work will be considered deficient if it does not conform to strength and material durability requirements (including water to cementitious materials ratio), location, elevation, dimension, shape, alignments, and/or appearance as required in the Contract Documents. Specific examples of deficient concrete include (but are not limited to):
   1. Concrete containing reinforcement that does not meet the requirements of the Contract Documents for size, quantity, strength, position, or arrangement.
   2. Concrete which differs from the required dimensions or locations in such a manner as to reduce the strength.
   3. Concrete surfaces not finished or cured in accordance with Section 03346.
   4. Concrete work in hot or cold weather that doesn't meet the requirements of the Contract Documents.
   5. Formed surfaces larger or smaller than specified dimensional tolerances. If the Engineer permits the Contractor to correct the error, such correction shall be

as directed and in such a manner as to maintain the strength, function and appearance of the structure.

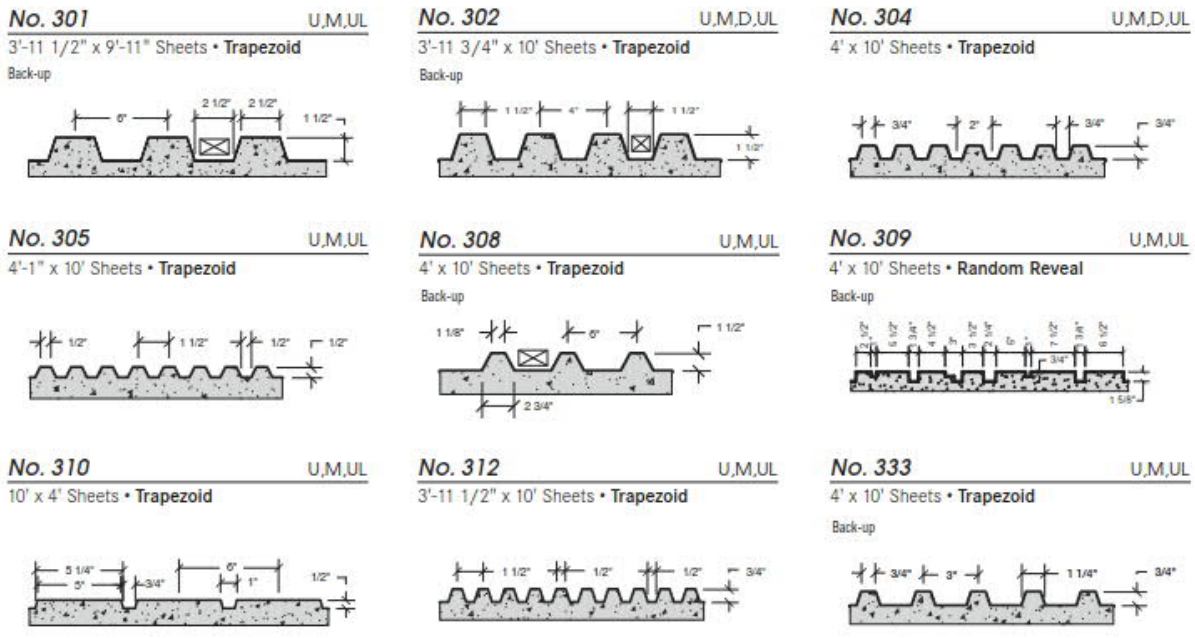
6. Concrete members cast in the wrong location may be rejected and shall be removed at no additional cost to the Owner if the strength, appearance or function of the structure is adversely affected.
7. Concrete exposed to view with defects that adversely affect the appearance of the specified finish shall be repaired. If, in the opinion of the Engineer, the defects cannot be repaired, the concrete may be rejected by the Engineer. Examples include:
   a. Non-uniform appearance including texture and color
   b. Excessive visible repairs of structural defects
8. Concrete work damaged from accidents, poor construction practices or fire.

B. Any deficient concrete may be subject to rejection and replacement at no additional cost to the Owner if the Engineer deems necessary.

TABLE 1 Classification of Aggregate Reactivity

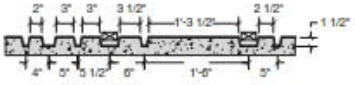
Aggregate-Reactivity Class	Description of Aggregate Reactivity	1-Year Expansion in Test Method C1293, %	14-Day Expansion in Test Method C1260, %
R0	Non-reactive	<0.04	<0.10
R1	Moderately reactive	≥0.04, <0.12	≥0.10, <0.30
R2	Highly reactive	≥0.12, <0.24	≥0.30, <0.45
R3	Very highly reactive	≥0.24	≥0.45

Ribbed Designs

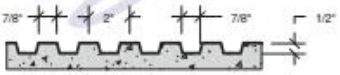


No. 334 U,M,UL
3'-10-3/4" x 10' Sheets • **Trapezoid**

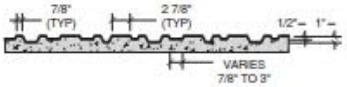
No. 335 U,M,UL
4' x 10' Sheets • **Random Rib**
Back-up



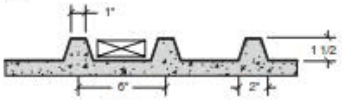
No. 339 U,M,UL
4' x 10' Sheets • **Trapezoid**



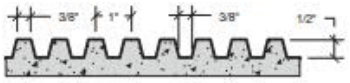
No. 353 U,M,D,UL
3'-11 3/4" x 9'-10" Sheets • **Random Parallel Reveals**
Back-up



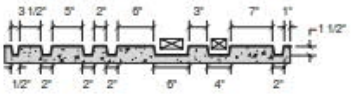
No. 359 U,M,UL
4' x 9'-6" Sheets • **Trapezoid**
Back-up



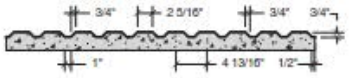
No. 361 U,M,UL
4' x 9'-10" Sheets • **Trapezoid**



No. 362 U,M,UL
4' x 9'-10" Sheets • **Random Reveal AZ D.O.T.**
Back-up



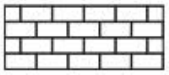
No. 396 U,M,UL
4'-0 1/8" x 10' Sheets • **Trapezoid**



Stone Designs

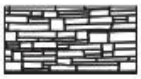
No. 328 U,M,UL
9'-10 3/4" x 3'-11 1/2" Sheets • **Drystack Random Stone**
Relief: Varies 1/2" - 1 1/2"

No. 329 U,M,UL
10' x 4' Sheets • **12" x 24" Running Bond Ashlar**
Relief: 1 1/2" maximum

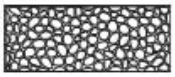


No. 330 U,M,D,UL
10' x 4' Sheets • **Ashlar Stone**
Relief: Varies 1/2" - 1 1/4"

No. 439 M,UL
7'-10 3/8" x 3'-10 3/4" Sheets • **Sierra Drystack**
Relief: 1 1/2" maximum

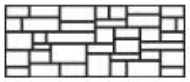


No. 440 U,M,UL
10'-1"x 4'-0 1/4" Sheets • **River Rock**
Relief: 2" maximum

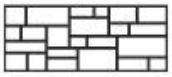


No. 454 U,M,UL
8' x 4' Sheets • **Spring Creek Stone**
Relief: 7/8" maximum

No. 460 U,M,UL
10'-1" x 4'-0 1/2" Sheets • **Ashlar Cut Stone**
Relief: 1 1/2" maximum

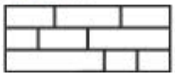


No. 462 U,M,UL
10'-1" x 4'-0 1/2" Sheets • **Zion Stone**
Relief: 2" maximum

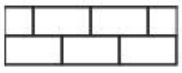


No. 468 U,M,UL
10'-0 1/2" x 3'-3 1/4" Sheets • **Willow Wall Stone**
Relief: 2" maximum

No. 472 U,M,UL
10'-0 3/4" x 4'-0 1/4"Sheets • **Random Cut Stone 16"**
Relief: 1 5/8" maximum



No. 476 U,M,UL
9' x 3'-0 3/8" Sheets • **Running Bond Cut Stone 18"**
Relief: 1 1/4" maximum

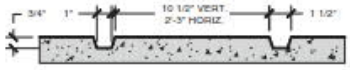


No. 477 U,M,UL
10' x 4' Sheets • **Meramec DryStack Stone**
Relief: 1 1/8" maximum

Block and Brick Designs

No. 303 U,M,UL

9'-5 1/2" x 3'-11 3/4" Sheets • **Smooth Face Block**



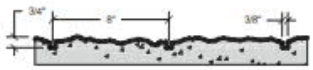
No. 338 U,M,D,UL

9'-2" x 4' Sheets • **Rough Brick**

Head Joints on 8" Centers

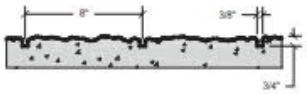
No. 341 U,M,UL

4' x 10'-0 3/8" Sheets • **8" Square Split Face Block**



No. 342 U,M,UL

9'-4" x 4' Sheets • **8" x 16" Split Face Block**



No. 345 U,M,UL

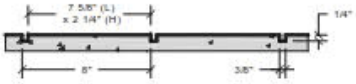
10' x 4' Sheets • **12" Square Split Face Block**

No. 365 U,M,UL

9'-4" x 4' Sheets • **8" x 16" Cinder Block**

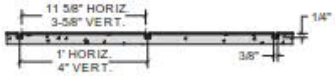
No. 403 U,M,UL

10' x 4' Sheets • **Smooth Face Brick**



No. 453 U,M,UL

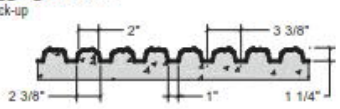
10' x 4' Sheets • **Smooth Face Utility Brick**



Fractured Designs

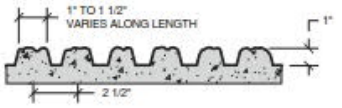
No. 347 U,M,UL

(Optional closed or open ends)
3'-11 1/2" x 9'-10" Sheets • **Trapezoid with Aggregate Face**
Back-up



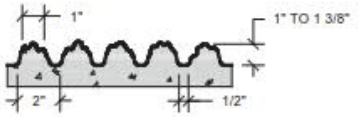
No. 366 U,M,D,UL

3'-11 1/4" x 10' Sheets • **Fractured Rib**



No. 367 U,M,D,UL

4' x 10' Sheets • **Fractured Rib VA D.O.T.**

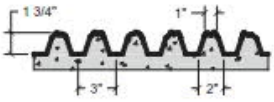


No. 368 U,M,D,UL

4'-1" x 10' Sheets • **Trapezoid with Aggregate Face**
Back-up

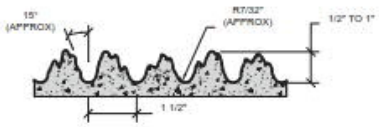
No. 369 U,M,D,UL

4' x 10' Sheets • **Trapezoid with Aggregate Face**
Back-up



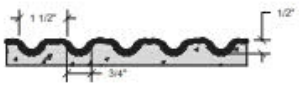
No. 373 U,M,D,UL

4' x 10' Sheets • **Fractured Fin**
Available with ribs rotated 45°



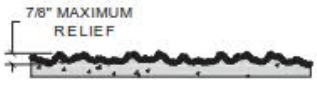
No. 374 U,M,UL

4' x 10' Sheets • **Ripped Rope**



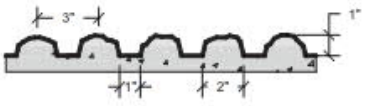
No. 376 U,M,UL

4' x 10' Sheets • **Fractured Granite**



No. 475 U,M,UL

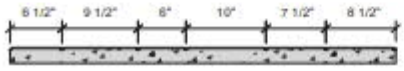
4' x 10' Sheets • **Large Fractured Trapezoid**



Wood Designs

No. 344 U,M,D

4' x 9'-10" Sheets • **Weathered Random Boards**

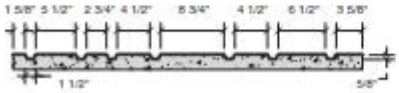


No. 346 U,M,D

4' x 9'-10" Sheets • **Weathered Boards**

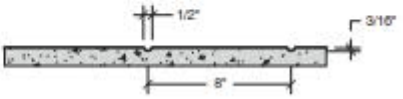
No. 351 U,M

4' x 9' Sheets • **Rough Southern Yellow Pine**



No. 363 U,M,D

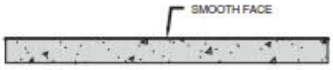
3'-11 3/4" x 9'-10" Sheets • **Weathered Tongue & Groove**



Miscellaneous

No. 340 U,M,D,UL

4' x 10' Sheets • **Smooth Face**



No. 349 U,M,D,UL

4' x 10' Sheets • **Light Sandblast Finish**

No. 350 U,M,UL

4' x 10' Sheets • **Split Face Texture**

No. 354 U,M

4' x 10' Sheets • **Striated Wave**

No. 355 U,M

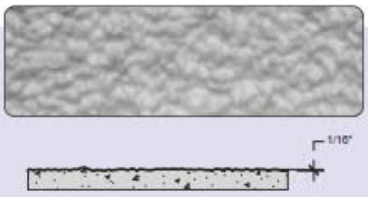
4' x 10' Sheets • **Random Striated Wave**

No. 357 U,M

10' x 4' Sheets • **Shiplap**
Back-up strips recommended

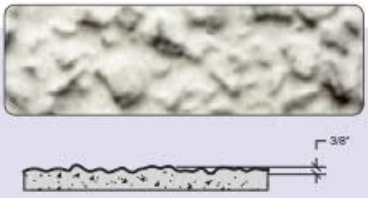
No. 348 U,M,D,UL

4' x 10' Sheets • **Medium Sandblast**



No. 360 U,M,D,UL

4' x 10' Sheets • **Riverbed Aggregate**



No. 377 U,M,D,UL

4' x 10' Sheets • **Flamed Granite**

END OF SECTION

WRIGHT-PIERCE™

Engineering a Better Environment