BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

REQUEST FOR PROPOSALS

Item Description: **CITY OF PROVIDENCE, ON-CALL SEWER & DRAINAGE REPAIRS (BLANKET CONTRACT 2023-2025)**

Date to be opened: **Monday, February 27, 2023**

Issuing Department: **Department of Public Works**

QUESTIONS

- Please direct questions relative to the bidding process, how to fill out forms, and how to submit a bid (Pages 1-8) to the Purchasing Department.
    - Email: purchasing@providenceri.gov
        - Please use the subject line "**RFP Question**"
- Please direct questions relative to the Minority and Women's Business Enterprise Program and the corresponding forms (Pages 9-13) to the MBE/WBE Outreach Director for the City of Providence:
    - Grace Diaz, MBE/WBE Outreach Director
        - Phone: (401) 680-5766
        - Email: gdiaz@providenceri.gov
        - Please use subject line "**MBE WBE Forms**"
- Please direct questions relative to the specifications outlined (beginning on page 14) to the issuing department's subject matter expert:
    - Roger Biron, Assistant Chief Engineer
        - (401) 680-7531
        - Rbiron@providenceri.gov
        - Please use the subject line **"RFP Question - CITY OF PROVIDENCE, ON-CALL SEWER & DRAINAGE REPAIRS (BLANKET CONTRACT 2023-2025)"**.

All questions or comments concerning this RFP must be submitted via email by Tuesday, February 14, 2023, at 12:00 PM. Bidders are responsible to monitor the website for addendum. An addendum acknowledgment page is included in the Bid Forms.

Pre-bid Conference

Please note, there is no pre-bid conference for this bid solicitation.

BOARD OF CONTRACT AND SUPPLY
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INSTRUCTIONS FOR SUBMISSION

Bids may be submitted up to **2:15 P.M.** on the above meeting date at the **Department of the City Clerk. Room 311, City Hall. 25 Dorrance Street, Providence.** At 2:15 P.M. all bids will be publicly opened and read at the Board of Contract Meeting in the City Council Chambers, on the 3rd floor of City Hall.

- Bidders must submit **2 copies** of their bid in sealed envelopes or packages labeled with the captioned **Item Description** and the **City Department to which the RFP and bid are related and must include the company name and address on the envelope as well**. (On page 1).
- If required by the Department, please keep the original bid bond and check in only one of the envelopes.
- Communications to the Board of Contract and Supply that are not competitive sealed bids (i.e. product information/samples) should have "**NOT A BID**" written on the envelope or wrapper.
- Only use form versions and templates included in this RFP. If you have an old version of a form do not recycle it for use in this bid.
- The bid envelope and information relative to the bid must be addressed to:

Board of Contract and Supply
Department of the City Clerk – City Hall, Room 311
25 Dorrance Street
Providence, RI 02903

****PLEASE NOTE: This bid may include details regarding information that you will need to provide (such as proof of licenses) to the issuing department before the formalization of an award.**

This information is NOT requested to be provided in your initial bid by design.

All bids submitted to the City Clerk become public record. Failure to follow instructions could result in information considered private being posted to the city's Open Meetings Portal and made available as a public record. The City has made a conscious effort to avoid the posting of sensitive information on the City's Open Meetings Portal, by requesting that such sensitive information be submitted to the issuing department only at their request.

BID PACKAGE CHECKLIST

Digital forms are available in the City of Providence Purchasing Department Office or online at **http://www.providenceri.gov/purchasing/how-to-submit-a-bid/**

The bid package **MUST** include the following, in this order:

- Bid Form 1: Bidder's Blank as the cover page/ 1st page (*see page **6** of this document*)
- Bid Form 2: Certification of Bidder as 2nd page (*see page **7** of this document*)
- Bid Form 3: Certificate Regarding Public Records (*see page **8** of this document)*
- Forms from the Minority and Women Business Enterprise Program: Based on Bidder Category. *See forms and instructions enclosed (pages **9-13**) or on: https://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/*

***Please note: MBE/WBE forms must be completed for EVERY bid submitted and must be inclusive of ALL required signatures. Forms without all required signatures will be considered incomplete.**

- Bidder's Proposal/Packet: Formal response to the specifications outlined in this RFP, including pricing information and details related to the good(s) or service(s) being provided. Please be mindful of formatting responses as requested to ensure clarity.
- Financial Assurance, *if requested* (a*s indicated on page 5 of this document under "Bid Terms")*

All of the above listed documents are REQUIRED. (With the exception of financial assurances, which are only required if specified on page 5.)

******Failure to meet specified deadlines, follow specific submission instructions, or enclose all required documents with all applicable signatures will result in disqualification, or in an inability to appropriately evaluate bids.***

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

NOTICE TO VENDORS

1. The Board of Contract and Supply will make the award to the lowest qualified and responsible bidder.
2. In determining the lowest responsible bidder, cash discounts based on preferable payment terms will not be considered.
3. Where prices are the same, the Board of Contract and Supply reserves the right to award to one bidder, or to split the award.
4. No proposal will be accepted if the bid is made in collusion with any other bidder.
5. Bids may be submitted on an "equal in quality" basis. The City reserves the right to decide equality. Bidders must indicate brand or the make being offered and submit detailed specifications if other than brand requested.
6. A bidder who is an out-of-state corporation shall qualify or register to transact business in this State, in accordance with the Rhode Island Business Corporation Act, RIGL Sec. 7-1.2-1401, et seq.
7. The Board of Contract and Supply reserves the right to reject any and all bids.
8. Competing bids may be viewed in person at the Department of the City Clerk, City Hall, Providence, immediately upon the conclusion of the formal Board of Contract and Supply meeting during which the bids were unsealed/opened. Bids may also be accessed electronically on the internet via the City's Open Meetings Portal.
9. As the City of Providence is exempt from the payment of Federal Excise Taxes and Rhode Island Sales Tax, prices quoted are not to include these taxes.
10. In case of error in the extension of prices quoted, the unit price will govern.
11. The contractor will **NOT** be permitted to: a) assign or underlet the contract, or b) assign either legally or equitably any monies or any claim thereto without the previous written consent of the City Purchasing Director.
12. Delivery dates must be shown in the bid. If no delivery date is specified, it will be assumed that an immediate delivery from stock will be made.
13. A certificate of insurance will normally be required of a successful vendor.
14. For many contracts involving construction, alteration and/or repair work, State law provisions concerning payment of prevailing wage rates apply (RIGL Sec. 37-13-1 et seq.)
15. No goods should be delivered, or work started without a Purchase Order.
16. **Submit 3 copies of the bid to the City Clerk, unless the specification section of this document indicates otherwise.**
17. Bidder must certify that it does not unlawfully discriminate on the basis of race, color, national origin, gender, gender identity or expression, sexual orientation and/or religion in its business and hiring practices and that all of its employees are lawfully employed under all applicable federal, state and local laws, rules and regulations. (See Bid Form 2.)

BOARD OF CONTRACT AND SUPPLY
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BID TERMS

1. Financial assurances may be required in order to be a successful bidder for Commodity or Construction and Service contracts. If either of the first two checkboxes below is checked, the specified assurance **must accompany** a bid, or the bid will not be considered by the Board of Contract and Supply. The third checkbox indicates the lowest responsible bidder will be contacted and required to post a bond to be awarded the contract.

   a) ☐ A certified check for **$**_____ must be deposited with the City Clerk as a guarantee that the Contract will be signed and delivered by the bidder.

   b) ☐ A bid bond in the amount of _____ per centum (%) of the proposed total price, must be deposited with the City Clerk as a guarantee that the contract will be signed and delivered by the bidder; and the amount of such bid bond shall be retained for the use of the City as liquidated damages in case of default.

   c) ☒ A performance and payment bond with a satisfactory surety company will be posted by the bidder in a sum equal to one hundred per centum (100%) of the awarded contract.

   d) ☐ No financial assurance is necessary for this item.

2. Awards will be made within **sixty (60) days of bid opening**. All bid prices will be considered firm, unless qualified otherwise. Requests for price increases will not be honored.
3. Failure to deliver within the time quoted or failure to meet specifications may result in default in accordance with the general specifications. It is agreed that deliveries and/or completion are subject to strikes, lockouts, accidents and Acts of God.

The following entry applies only for COMMODITY BID TERMS:

4. Payment for partial delivery will not be allowed except when provided for in blanket or term contracts.

The following entries apply only for CONSTRUCTION AND SERVICE BID TERMS:

5. Only one shipping charge will be applied in the event of partial deliveries for blanket or term contracts.
6. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Rhode Island Worker's Compensation Act, RIGL 28-29-1, et seq. If exempt from compliance, the successful bidder shall submit a sworn Affidavit by a corporate officer to that effect, which shall accompany the signed contract.
7. Prior to commencing performance under the contract, the successful bidder shall, submit a certificate of insurance, in a form and in an amount satisfactory to the City.

BOARD OF CONTRACT AND SUPPLY
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BID FORM 1: Bidders Blank

1. Bids must meet the attached specifications. Any exceptions or modifications must be noted and fully explained.
2. Bidder's responses must be in ink or typewritten, and all blanks on the bid form should be completed.
3. The price or prices proposed should be stated both in **WRITING** and in **FIGURES**, and any proposal not so stated may be rejected. **Contracts exceeding twelve months must specify annual costs for each year.**
4. Bids **SHOULD BE TOTALED** so that the final cost is clearly stated (unless submitting a unit price bid), however **each item should be priced individually**. Do not group items. Awards may be made on the basis of ***total*** bid or by ***individual items***.
5. All bids **MUST BE SIGNED IN INK.**

Name of Bidder (Firm or Individual): _____

Contact Name: _____

Business Address: _____

Business Phone #: _____

Contact Email Address: _____

Agrees to bid on (Write the "Item Description" here): _____

If the bidder's company is based in a state *other than Rhode Island*, list name and contact information for a local agent for service of process that ***is located within Rhode Island*** _____

Delivery Date (if applicable): _____

Name of Surety Company (if applicable): _____

Total Amount in Writing*: ____Unit Price Bid_____

Total Amount in Figures*: ____Unit Price Bid_____

**** If you are submitting a unit price bid, please insert "Unit Price Bid"***

Use additional pages if necessary for additional bidding details.

_____

Signature of Representation

_____

Title

BOARD OF CONTRACT AND SUPPLY
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BID FORM 2: Certification of Bidder
(Non-Discrimination/Hiring)

Upon behalf of_____ (Firm or Individual Bidding),

I,_____(Name of Person Making Certification),

being its_____(Title or "Self"), hereby certify that:

1. Bidder does not unlawfully discriminate on the basis of race, color, national origin, gender, sexual orientation and/or religion in its business and hiring practices.
2. All of Bidder's employees have been hired in compliance with all applicable federal, state and local laws, rules and regulations.

I affirm by signing below that I am duly authorized on behalf of Bidder, on this_____day of_____20____.

_____
Signature of Representation

_____
Printed Name

BID FORM 3: Certificate Regarding Public Records

Upon behalf of_____ (Firm or Individual Bidding),

I,_____(Name of Person Making Certification),

being its_____(Title or "Self"), hereby certify an

understanding that:

1. All bids submitted in response to Requests for Proposals (RFP's) and Requests for Qualification (RFQ's), documents contained within, and the details outlined on those documents become public record upon receipt by the City Clerk's office and opening at the corresponding Board of Contract and Supply (BOCS) meeting.
2. The Purchasing Department and the issuing department for this RFP/RFQ have made a conscious effort to request that sensitive/personal information be submitted directly to the issuing department and only at request if verification of specific details is critical the evaluation of a vendor's bid.
3. The requested supplemental information may be crucial to evaluating bids. Failure to provide such details may result in disqualification, or an inability to appropriately evaluate bids.
4. If sensitive information that has not been requested is enclosed or if a bidder opts to enclose the defined supplemental information prior to the issuing department's request in the bidding packet submitted to the City Clerk, the City of Providence has no obligation to redact those details and bears no liability associated with the information becoming public record.
5. The City of Providence observes a public and transparent bidding process. Information required in the bidding packet may not be submitted directly to the issuing department at the discretion of the bidder in order to protect other information, such as pricing terms, from becoming public. Bidders who make such an attempt will be disqualified.

I affirm by signing below that I am duly authorized on behalf of Bidder, on

this_____day of_____20____.

_____

Signature of Representation

_____

Printed Name

WBE/MBE Form Instructions

The City of Providence actively seeks Minority and Women business enterprises to participate in bids to meet the City's procurement needs. Pursuant to the City of Providence Code of Ordinances, Chapter 21, Article II, Sec. 21-52 (Minority and Women's Business Enterprise) and Rhode Island General Laws (as amended), Chapter 31-14, et seq. (Minority Business Enterprise), Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is **10%** of the total bid value.
The goal for Women's Business Enterprise (WBE) participation is **10%** of the total bid value.
The goal for combined MBE/WBE participation is **20%** of the total bid value.

Only businesses certified with the State of Rhode Island as minority and/or women business enterprises are counted towards the City's goals. Eligible minority or women-owned businesses are encouraged to seek certification from the State of Rhode Island Minority Business Enterprise Compliance Office at: http://odeo.ri.gov/offices/mbeco/

Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

Bid Requirements:

All Bidders: All bidders **must complete and submit the *MBE/WBE Participation Affidavit*** indicating whether or not they are a state-certified MBE/WBE and acknowledging the City's participation goals. Submission of this form is **required with every bid**. **Your bid will not be accepted without an affidavit**.

Bidders who will be subcontracting: In addition to the MBE/WBE Participation Affidavit, Bidders who will be subcontracting must submit the ***Subcontractor Disclosure Form*** as part of their bid submission. All subcontractors, regardless of MBE/WBE status, must be listed on this form. Business NAICS codes can be found at https://www.naics.com/search/. Awarded bidders are required to submit

Subcontractor Utilization and Payment Reports with each invoice.

Waiver Requests:

a) If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box F on the Subcontractor Disclosure Form) and the prime contractor is not a Rhode Island State-certified MBE or WBE, the Bidder must complete the *MBE/WBE Waiver Request Form* for review.

b) If the prime contractor company has the capacity to perform the whole project, the City of Providence requires the contractor to meet the city's goal of a combined 20% of MBE and WBE participation.

c) If the contractor is a nonprofit organization, the City of Providence requires the nonprofit organization to provide the *MBE/WBE Participation Affidavit Form* and proof of its nonprofit status.

d) If the contractor has researched the RI Certified minority list (http://odeo.ri.gov/offices/mbeco/mbe-wbe.php) and the state does not have any companies in the desired trade, the City of Providence requires the contractor to provide the *MBE/WBE Participation Affidavit Form*.

e) Waivers will be considered for approval on a case-by-case basis.

Verifying MBE/WBE Certification

It is the responsibility of the bidder to confirm that every MBE or WBE named in a proposal and included on a contract is certified by the Rhode Island Minority Business Enterprise Compliance Office. The current MBE/WBE directory is available at the State of RI MBE Office, One Capitol Hill, 2nd Floor, Providence, RI, or online at http://odeo.ri.gov/offices/mbeco/mbe-wbe.php. You can also call (401) 574-8670 to verify certification, expiration dates, and services that the MBE/WBE is certified to provide. Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

Form Instructions:

Access all bid forms from http://www.providenceri.gov/oeo/ or http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/. Download the forms as blank PDFs. Once saved on your computer, fill them out using the Adobe program. The fillable PDFs must be completed in Adobe in order to be saved property. Google Chrome and similar platforms do not allow for the forms to be saved as filled PDFs. Therefore, please download the blank forms to your computer, then fill them out and save.

Assistance with Form Requirements

Examples of completed forms can be found on the City of Providence website at http://www.providenceri.gov/oeo/ or http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/.

Contract Requirements:

Prime contractors engaging subcontractors must submit the ***Subcontractor Utilization and Payment Report*** to the City Department's Fiscal Agent with every invoice and request for final payment. A copy of all forms should be sent to the MBE/WBE Outreach Director Office, Grace Diaz at gdiaz@providenceri.gov. This form is not submitted as a part of the initial bid package.

For contracts with durations of less than 3 months, this form must be submitted along with the contractor's request for final payment. The form must include all subcontractors utilized on the contract, both MBE/WBE and non- MBE/WBE, the total amount paid to each subcontractor for the given period and to date, A copy of all forms should be sent to the MBE/WBE Outreach Director Office, Grace Diaz at gdiaz@providenceri.gov. During the term of the contract, any unjustified failure to comply with the MBE/WBE participation requirements is a material breach of contract.

Questions?

For more information or for assistance with MBE/WBE Forms, contact the City of Providence MBE/WBE Outreach Director, Grace Diaz, at gdiaz@providenceri.gov or (401) 680-5766.

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

MBE/WBE PARTICIPATION AFFIDAVIT

Project /Item Description (as seen on RFP):

_____

_____

_____

Prime Bidder: _____Contact Email and Phone_____

Company Name, Address and Trade: _____

_____

_____

Which one of the following describes your business' status in terms of Minority and/or Woman-Owned Business Enterprise certification with the State of Rhode Island? _____MBE _____WBE _____Neither MBE nor WBE

By initialing the following sections and signing the bottom of this document in my capacity as the contractor or an authorized representative of contractor, I make this Affidavit:

It is the policy of the City of Providence that minority business enterprises (MBEs) and women business enterprises (WBEs) should have the maximum opportunity to participate in procurements and projects as prime contractors and vendors. Pursuant to Sec. 21-52 of the Providence Code of Ordinances and Chapter 31-14 *et seq*. of the Rhode Island General Laws (as amended), MBE and WBE participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is 10% of the total bid value.
The goal for Women's Business Enterprise (WBE) participation is 10% of the total bid value.
The goal for combined MBE/WBE participation is 20% of the total bid value.

I acknowledge the City of Providence's goals of supporting MBE/WBE certified businesses. Initial _____

If awarded the contract, I understand that my company must submit to the Minority and Women's Business Coordinator at the City of Providence (MBE/WBE Office), copies of all executed agreements with the subcontractor(s) being utilized to achieve the participation goals and other requirements of the RI General Laws. **I understand that these documents must be submitted prior to the issuance of a notice to proceed**. Initial _____

I understand that, if awarded the contract, my firm must submit to the MBE/WBE Office canceled checks and reports required by the MBE/WBE Office on a quarterly basis verifying payments to the subcontractors(s) utilized on the contract. Initial _____

If I am awarded this contract and find that I am unable to utilize the subcontractor(s) identified in my Statement of Intent, I understand that I must substitute another certified MBE and WBE firm(s) to meet the participation goals. **I understand that I may not make a substitution until I have obtained the written approval of the MBE/WBE Office**.
Initial _____

If awarded this contract, I understand that authorized representatives of the City of Providence may examine the books, records and files of my firm from time to time, to the extent that such material is relevant to a determination of whether my firm is complying with the City's MBE/WBE participation requirements.
Initial _____

I do solemnly declare and affirm under the penalty of perjury that the contents of the foregoing Affidavit are true and correct to the best of my knowledge, information, and belief.

_____ _____
Signature of Bidder Printed Name

_____ _____
Company Name Date

BOARD OF CONTRACT AND SUPPLY
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SUBCONTRACTOR DISCLOSURE FORM

Fill out this form only if you WILL SUBCONTRACT with other parties. If you will not subcontract any portion of the proposed bid, do not fill out this form.

Prime Bidder: _____ Primary NAICS_____
Code:_____

Item Description (as seen on RFP): _____

_____

Please list all Subcontractors below. Include the total dollar value that you propose to share with each subcontractor and the dollar amount to be subcontracted. Please check off MBE and WBE where applicable. The directory of all state-certified MBE/WBE firms is located at www.mbe.ri.gov. Business NAICS codes can be found at https://www.naics.com/search/

Proposed Subcontractor	MBE	WBE	Primary NAICS Code	Date of Mobilization	$ Value of Subcontract
					$
					$
					$
					$
					$
					$
A. MBE SUBCONTRACTED AMOUNT:					$
B. WBE SUBCONTRACTED AMOUNT:					$
C. NON-MBE WBE SUBCONTRACTED AMOUNT:					$
D. DOLLAR AMOUNT OF WORK DONE BY THE PRIME CONTRACTOR:					$
E. TOTAL AMOUNT OF BID (SUM OF A, B, C, & D):					$
F. PERCENTAGE OF BID SUBCONTRACTED TO MBEs AND WBEs. (Divide the sum of A and B by E and multiply result by 100).					%

Please read and initial the following statement acknowledging you understand. If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box (F) and the prime contractor is NOT a Rhode Island State-certified MBE or WBE, **you must fill out the MBE/WBE WAIVER REQUEST FORM for consideration by City of Providence MBE/WBE Outreach Director**. Initial _____ Required

_____ _____
Signature of Bidder Printed Name

BOARD OF CONTRACT AND SUPPLY
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MBE/WBE Waiver Request Form

Fill out this form only if you did not meet the 20% MBE/WBE participation goal.
State-certified MBE or WBE Prime Bidders are NOT REQUIRED to fill out this form.

Submit this form to the City of Providence MBE/WBE Outreach Director, Grace Diaz, at mbe-wbe@providenceri.gov, for review **prior to bid submission.** This waiver applies only to the current bid which you are submitting to the City of Providence and does not apply to other bids your company may submit in the future. **In case a waiver is needed, City Department Directors should not** recommend a bidder for award if this form is not included, absent or is not signed by the city of Providence MBE/WBE director**.**

Prime Bidder: _____ Contact Email and Phone_____
Company Name, Address: _____ Trade _____
Project /Item Description (as seen on RFP):
_____
_____

To receive a waiver, you must list the certified MBE and/or WBE companies you contacted, the name of the primary individual with whom you interacted, and the reason the MBE/WBE company could not participate on this project.

MBE/WBE Company Name	Individual's Name	Company Name	Why did you choose not to work with this company?

I acknowledge the City of Providence's goal of a combined MBE/WBE participation is 20% of the total bid value. I am requesting a waiver of _____ % MBE/WBE (20% minus the value of **Box F** on the Subcontractor Disclosure Form). If an opportunity is identified to subcontract any task associated with the fulfillment of this contract, a good faith effort will be made to select MBE/WBE certified businesses as partners.

_____	_____	_____
Signature of Prime Contractor / or Duly Authorized Representative	Printed Name	Date Signed
_____	_____	_____
Signature of City of Providence (or Designee (Only) MBE/WBE Outreach Director	Printed Name of City of Providence MBE/WBE Outreach Director	Date Signed

BID PACKAGE SPECIFICATIONS

See attached bid documents and specifications, beginning on Page 18.

SUPPLEMENTAL INFORMATION

If the issuing department for this RFP determines that your firm's bid is best suited to accommodate their need, you will be asked to provide proof of the following prior to formalizing an award.

An inability to provide the outlined items at the request of the department may lead to the disqualification of your bid.

This information is <u>NOT</u> requested to be provided in your initial bid that you will submit to the City Clerk's office by the "date to be opened" noted on page 1. This list only serves as a list of items that your firm should be ready to provide on request.

<u>All bids submitted to the City Clerk become public record</u>. Failure to follow instructions could result in information considered private being posted to the city's Open Meetings Portal and made available as a public record.

You must be able to provide:

- Business Tax ID will be requested after an award is approved by the Board of Contract and Supply.

BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

CITY OF PROVIDENCE STANDARD TERMS & CONDITIONS

1. The terms "you" and "your" contained herein refer to the person or entity that is a party to the agreement with the City of Providence ("the City") and to such person's or entity's employees, officers, and agents.
2. The Request For Proposals ("RFP") and these Standard Terms and Conditions together constitute the entire agreement of the parties ("the Agreement") with regard to any and all matters. By your submission of a bid proposal or response to the City's RFP, you accept these Standard Terms & Conditions and agree that they supersede any conflicting provisions provided by bid or in any terms and conditions contained or linked within a bid and/or response. Changes in the terms and conditions of the Agreement, or the scope of work thereunder, may only be made by a writing signed by the parties.
3. You are an independent contractor and in no way does this Agreement render you an employee or agent of the City or entitle you to fringe benefits, workers' compensation, pension obligations, retirement or any other employment benefits. The City shall not deduct federal or state income taxes, social security or Medicare withholdings, or any other taxes required to be deducted by an employer, and this is your responsibility to yourself and your employees and agents.
4. You shall not assign your rights and obligations under this Agreement without the prior written consent of the City. Any assignment without prior written consent of the City shall be voidable at the election of the City. The City retains the right to refuse any and all assignments in the City's sole and absolute discretion.
5. Invoices submitted to the City shall be payable sixty (60) days from the time of receipt by the City. Invoices shall include support documentation necessary to evidence completion of the work being invoiced. The City may request any other reasonable documentation in support of an invoice. The time for payment shall not commence, and invoices shall not be processed for payment, until you provide reasonably sufficient support documentation. In no circumstances shall the City be obligated to pay or shall you be entitled to receive interest on any overdue invoice or payment. In no circumstances shall the City be obligated to pay any costs associated with your collection of an outstanding invoice.
6. For contracts involving construction, alteration, and/or repair work, the provisions of applicable state labor law concerning payment of prevailing wage rates (R.I. Gen. Laws §§ 37-13-1 et seq., as amended) and the City's First Source Ordinance (Providence Code of Ordinances §§ 21-91 et seq., as amended) apply.
7. With regard to any issues, claims, or controversies that may arise under this Agreement, the City shall not be required to submit to dispute resolution or mandatory/binding arbitration. Nothing prevents the parties from mutually agreeing to settle any disputes using mediation or non-binding arbitration.
8. To the fullest extent permitted by law, you shall indemnify, defend, and hold harmless the City, its employees, officers, agents, and assigns from and against any and all claims, damages, losses, allegations, demands, actions, causes of action, suits, obligations, fines, penalties, judgments, liabilities, costs and expenses, including but not limited to attorneys' fees, of any nature whatsoever arising out of, in connection with, or resulting from the performance of the work provided in the Agreement.
9. You shall maintain throughout the term of this Agreement the insurance coverage that is required by the RFP or, if none is required in the RFP, insurance coverage that is considered in your industry to be commercially reasonable, and you agree to name the City as an additional insured on your general liability policy and on any umbrella policy you carry.
10. The City shall not subject itself to any contractual limitations on liability. The City shall have the time permitted within the applicable statute of limitations, and no less, to bring or assert any and all causes of action, suits, claims or demands the City may have arising out of, in connection with, or resulting from the performance of the work provided in the Agreement, and in no event does the City agree to limit your liability to the price of the Agreement or any other monetary limit.
11. The City may terminate this Agreement upon five (5) days' written notice to you if you fail to observe any of the terms and conditions of this Agreement, or if the City believes your ability to perform the

terms and conditions of this Agreement has been materially impaired in any way, including but in no way limited to loss of insurance coverage, lapsing of a surety bond, if required, declaration of bankruptcy, or appointment of a receiver. In the event of termination by the City, you shall be entitled to just and equitable compensation for any satisfactory work completed and expenses incurred up to the date of termination.

12. Written notice hereunder shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the entity for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known by the party providing notice.
13. In no event shall the Agreement automatically renew or be extended without a writing signed by the parties.
14. You agree that products produced or resulting from the performance of the Agreement are the sole property of the City and may not be used by you without the express written permission of the City.
15. For any Agreement involving the sharing or exchange of data involving potentially confidential and/or personal information, you shall comply with any and all state and/or federal laws or regulations applicable to confidential and/or personal information you receive from the City, including but not limited to the Rhode Island Identity Theft Protection Act, R.I. Gen. Laws § 11-49.3-1, during the term of the Agreement. You shall implement and maintain appropriate physical, technical, and administrative security measures for the protection of, and to prevent access to, use, or disclosure of, confidential and/or personal information. In the event of a breach of such information, you shall notify the City of such breach immediately, but in no event later than twenty-four (24) hours after discovery of such breach.
16. The Agreement is governed by the laws of the State of Rhode Island. You expressly submit yourself to and agree that any and all actions arising out of, in connection with, or resulting from the performance of the Agreement or relationship between the parties shall occur solely in the venue and jurisdiction of the State of Rhode Island or the federal court located in Rhode Island.
17. The failure of the City to require performance of any provision shall not affect the City's right to require performance at any time thereafter, nor shall a waiver of any breach or default of this Agreement constitute a waiver of any subsequent breach or default or a waiver of the provision itself.
18. If any term or provision of this Agreement, or the application thereof to any person or circumstance shall, in any extent, be invalid or unenforceable, the remainder of this Agreement shall not be affected thereby, and each term and provision shall be valid and enforceable to the fullest extent permitted by law.

CITY OF

CONTRACT DOCUMENTS

CITY OF PROVIDENCE,
ON-CALL SEWER & DRAINAGE REPAIRS
(BLANKET CONTRACT 2023-2025)

PROVIDENCE, RHODE ISLAND

HONORABLE BRETT P. SMILEY
MAYOR, CITY OF PROVIDENCE

PREPARED BY:

DEPARTMENT OF PUBLIC WORKS
700 ALLENS AVENUE
PROVIDENCE, RI 02905
401-680-7500

PATRICIA A. COYNE-FAGUE, ESQ.
DIRECTOR

JANUARY, 2023

(Ver. 2022-01-13)

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1. INVITATION FOR BIDS

The purpose of this Request for Proposal (RFP) is to identify Contractors to provide on-call sewer/drainage repair and rehabilitation services for the next three years. The City of Providence is seeking Contractors who could be available on a regular basis to provide on-call services (both routine and emergency). Interested firms are invited to submit their responses in conformance with the criteria outlined herein.

The work to be performed under this Contract includes, but is not limited to, all labor, material, and equipment necessary to perform emergency and on-call projects for the replacement and/or rehabilitation of the existing sewer and drainage system in Providence, Rhode Island. A project's work shall include, but not necessarily be limited to the following: excavation and backfilling within the public right-of-way and/or private property; placement of associated temporary and permanent restoration of streets, sidewalks, and grassed areas; the removal, disposal, and replacement of existing sewer/drainage pipes, and appurtenances; preparatory cleaning of existing sewers; CCTV inspection; open cut spot repairs of mainline sewer and drainage pipe segments; reinstatement of service laterals as required; installing new sewer and drainage piping, structures, and/or appurtenances; temporary bypass systems; Cured-in-Place Pipe (CIPP) lining in pipes; reinstatement of service laterals as required during CIPP, including the removal of all coupons and excess resin, grouting of service lateral connections as needed; raising buried manholes, as required; installing new manholes, catch basins, and other sewer/drainage structures as required; including all related work, miscellaneous items as specified herein, and future repairs identified and directed by the City of Providence Department of Public Works.

The OWNER is defined as the City of Providence (City), and the City of Providence Department of Public Works (DPW). This contract is intended to perform sewer repairs as needed, to be completed as dictated for each unique project, in accordance with the Contract Documents or any other specification/condition for each unique project solicitation. This contract is intended to run through **December 31, 2025**.

Pursuant to the Blanket Contract, the OWNER anticipates that it may at times identify an on-call Project with a denoted specific scope of work. With respect to each on-call Project, the Contractor(s) shall become thoroughly familiar with the scope of the work, including site visits as may be necessary and shall provide the OWNER with the following items:

- A "Not to Exceed Lump Sum" or "Unit Rate" cost proposal for the Project.
- Detailed documentation of cost proposal computations for the Project, showing expected labor and equipment hours, material, and subcontractor costs.
- A Project Schedule, including Start & Finish Dates and milestones.

Cost proposals for each Project will be considered for acceptance by the OWNER. The OWNER reserves the right to accept proposals, reject proposals, negotiate acceptable proposals, or to subsequently award the project(s) to any contractor, as deemed to be in the OWNER's best interest. Upon acceptance of each proposal, or portion thereof, the OWNER will provide a Notice-to-Proceed letter describing the terms of acceptance for each project assignment.

Any additional work required to complete a Project, not included in the Contractor's Project proposal, must be approved by the OWNER prior to performing the additional work and, if approved, will be paid at the hourly rates for labor and equipment and invoice cost plus percentages mark-ups for materials and subcontractors, as specified within the Contract Documents' Bid Schedule.

For emergency work where immediate mobilization is required, the Contractor will be paid at the hourly rates for labor and equipment and invoice cost plus percentages mark-ups for materials and subcontractors, as specified within the Contract Documents' Bid Schedule. Awarded Contractors shall be contacted by DPW based on previous work experience with the City and shall be selected based on their ability to initiate the emergency work upon notice.

It is Department of Public Work's intent to select multiple responsive and responsible respondents, in accordance with the criteria set forth in herein to perform the on-call work described above. Selection by

the City does not guarantee work to be proposed or assigned.

This Blanket Contract is anticipated to begin in 2023 extending through the next three (3) years (2023, 2024, and 2025), to December 31, 2025.

Copies of the Bidding/Contract Documents will be available for inspection at the office of the Purchasing Agent, Providence City Hall, 3rd Floor, Providence, Rhode Island 02903, on January 30, 2023. Bid documents will also be available for download from https://www.providenceri.gov/purchasing/. There will be no charge or fee for obtaining each set of bidding documents.

A Performance Bond in an amount of One Hundred (100%) percent of the contract price and a Labor and Material Payment Bond in the amount of One Hundred (100%) percent of the Contract Price with a satisfactory surety company will be required of the successful bidder for each awarded project assigned. All surety companies must be listed with the Department of the Treasury, Fiscal Services, Circular 570 (Latest Revision published by the Federal Register). All bonds shall be in accordance with RIGL 37-12-1 and RIGL 37-13-14.

The Bidders' attention is called to the fact that minimum salaries and wages, as set forth in the Bidding/Contract Documents, must be paid on this project. Paid wages shall be at rates not less than those prevailing on the same type of work on similar construction in the immediate locality as determined by the United States Secretary of Labor, in accordance with the Act of August 30, 1935, known as the Davis-Bacon Act, under Decision Nos. 1 through 6 as applicable. Prevailing wage rates and Davis-Bacon Wage Determination Reference Materials are available online at https://beta.sam.gov/.

The Bidders' attention is called to the fact that the Project is using federal assistance provided to the City of Providence by the U.S. Department of Treasury from the Coronavirus State and Local Fiscal Recovery Fund established pursuant to Sections 602 and 603 of the Social Security Act, as added by Section 9901 of the American Rescue Plan Act of 2021, Pub. L. No. 117-2 (March 11, 2021) (“ARPA”). Certain terms and conditions will apply to contractors and vendors entering this contract pursuant to ARPA, its applicable regulations, and/or as established by the U.S. Department of Treasury. These terms and conditions can be found in the Contract Addendum section of this manual.

The Bidders' attention is called to the fact that the Contractor must ensure that employees and applicants for employment are not discriminated against because of their race, color, place of national origin, religion, sexual preference, or gender.

The OWNER will not consider bids from prime bidders who do not prove at least 5 years construction experience (within the last 7 years) on sewer and drainage replacement and rehabilitation projects for a municipality of a comparable size to the City of Providence. These Projects shall be defined as existing, active construction projects within an existing city, state, or federally owned right-of-way. Instructions on documenting this experience are included in the "Statement of Bidders Qualifications" bid form in the Contract Documents.

Bids may be held by the OWNER for a period not to exceed ninety (90) days from the date of opening of bids, for the purpose of reviewing the bids and investigating the qualifications of bidders, all prior to award of the Contract. The OWNER reserves the right to reject any or all bids either in part or in full. All bidders shall be available for a Pre-Bid Award Descope Meeting as may be required by the OWNER. The OWNER reserves the right to descope one or more bidders. Additionally, the meeting minutes of the Descope Meeting shall be enumerated as part of the signed contract agreement. The intent is NOT to renegotiate cost in any manner but to obtain clarifications and details of representations made by the Bidder to assure an understanding of the bid prior to final award.

After a thorough review (and descope as required) of bids, the OWNER anticipates submitting their recommendation for award of contract to the lowest responsible bidder to the Board of Contract and Supply for its regular meeting of Monday, March 27, 2023. The Board of Contract and Supply may take up to sixty (60) days to formally award.

2. INSTRUCTION TO BIDDERS

2.1. USE OF SEPARATE BID FORMS

The Contract Documents include a complete set of Bidding Documents such as, but not limited to Front End Documents, Specifications, Drawings, Addendum and Contract forms which are compiled for the convenience of Bidders and are not to be detached from the Contract Documents, filled out, or executed. Separate copies of the Bid Forms are furnished for this purpose and can be found in this document.

2.2. INTERPRETATIONS OR ADDENDA

No oral interpretation will be made to any Bidder as to the meaning of the Contract Documents or any part thereof. Every request for such an interpretation shall be made in writing to the OWNER. Any inquiry received seven or more days prior to the date fixed for opening of Bids will be given consideration. Every interpretation made to a bidder will be in the form of an Addendum to the Contract Documents when issued and will be on file with the City of Providence Purchasing Department. In addition, all Addenda will be emailed to each person registered as holding Contract Documents, but it shall be the Bidder's responsibility to make inquiry as to the Addenda issued. All such addenda shall become part of the Contract and all Bidders shall be bound by such Addenda, whether or not received by the Bidder.

2.3. INSPECTION OF SITE

A. Each Bidder should visit the site in person and not rely on digital street and overhead views provided by mediums such as, but not limited to, Google and Bing to review areas of the proposed work and fully acquaint himself with the existing conditions there, relating to construction and labor, and should fully inform himself as to the facilities involved, the difficulties and restrictions attending the performance of the Contract. The Bidder should thoroughly examine and familiarize himself with the Drawings, Technical Specifications and all other Contract Documents and supporting information. The Contractor, by the execution of the Contract, shall in no way be relieved of any obligation under it due to their failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions there existing, and the OWNER will be justified in rejecting any claim based on facts regarding which, he should have been on notice as a result thereof.

B. At the time of the opening of Bids, each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Contract Documents (including all addenda). The failure or omission of any Bidder to examine any form, instrument or document or to inspect the site, shall in no way relieve any Bidder from any obligation in respect to their Bid.

2.4. ALTERNATIVE BIDS

NOT USED

2.5. ALLOWANCES

NOT USED

2.6. BIDS

A. All Bids must be submitted on forms supplied by the OWNER and shall include all of the requirements of the Contract Documents, including, but not limited to, the Drawings and other incidental and appurtenant exhibits including these INSTRUCTIONS FOR BIDDERS. All Bids shall be complete in every respect and no interlineations, excisions or special conditions shall

be made to be included in the Bid Form by the Bidder. All blank spaces for Bid Prices shall be filled in in ink or typewritten; in both words and figures.

B. Required documents: Bid, Bid Documents including the Bid, the Non-Collusion Affidavit, and the Statement of Bidder's Qualifications, shall be submitted to the City's Board of Contract and Supply as indicated on Page 1 of this document. One original and one paper copy of the bid documents and required forms shall be submitted along with one USB drive with a single PDF containing all bid documents and required forms. No CDs or emailed PDFs will be accepted. Failure to submit a USB stick with a single PDF of the required documents and forms may result in disqualification.

C. The OWNER may consider as irregular any Bid on which there is an alteration of or departure from the Bid Form hereto attached and, at its option may reject the same.

D. It is Department of Public Work's intent to award multiple, three (3) year blanket contracts to the responsive and responsible bidders, in accordance with the criteria set forth in herein to perform the on-call work described in the INVITATION TO BID. The Contract will require the completion of the work according to the Contract Documents.

E. Each Bidder shall include in their Bid the following information:

1. Firm (name, address, phone, web address)

2. Principals (names and home addresses)

2.7. BID GUARANTEE

NOT USED

2.8. COLLUSIVE AGREEMENTS

A. Each Bidder submitting a Bid to the OWNER for any portion of the work contemplated by the documents on which bidding is based, shall execute and attach thereto, an affidavit substantially in the form herein provided, to the effect that he has not entered into a collusive agreement with any other person, firm, or corporation in regard to any Bid submitted.

B. Before executing any subcontract, the successful Bidder shall submit the name of any proposed Subcontractor for prior approval and an affidavit substantially in the form provided in this document.

2.9. STATEMENT OF BIDDER'S QUALIFICATIONS

A. Each Bidder shall completely fill out a Statement of Bidder's Qualifications noting their experience record in constructing the type of improvements embraced in the work, their organization and equipment available for the work contemplated on the form furnished for that purpose, and when specifically requested by the OWNER, a detailed financial statement. The OWNER shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform their obligations under the Contract and the Bidder shall furnish the OWNER all such information and data for this purpose as it may request. The right is reserved to reject any Bid where an investigation of the available evidence or information does not satisfy the OWNER that the Bidder is qualified to carry out properly the terms of the contract.

B. The Bidder (Responsive and Responsible) must:

1. Provide a list of equipment owned/leased in their possession;

2. Provide the names and qualifications of the Superintendent and Supervisory personnel assigned major features of work;

3. Provide a description of all self-performed work;

4. Provide the names of proposed subcontractors and extent of work to be performed;

5. The Contractor shall demonstrate and provide a work plan to comply with the State Public Works Contract apprenticeship program as prescribed by RIGL Title 37 Section 37-13-3.1. These documents are considered part of the Contract as if attached and written in full.

6. Provide the name of the firm's Equal Employment Opportunity with reference to the City or State;

7. Provide Certification of Non-Discrimination in Equal Employment Opportunity with reference to the State;

8. Provide financial references and set of audited financial statements (prepared by a CPA) for most recent 3-year period to City for its' review and approval;

9. Provide original letters from Bonding & Insurance Companies District Offices indicating willingness to furnish bonds/certificates;

10. Provide insurance documentation naming the OWNER as additionally insured;

11. Provide list of 10 most recent contracts completed;

12. Provide list of all uncompleted contracts;

13. List whether in the past 3 years the firm has had any bids rejected for lack of qualifications, Responsibility, submission of informal/non-responsive bids, been denied or revoked of pre- qualification; or violated any State labor law or prevailing wage citation.

14. Provide proof of five years' work experience on projects of similar scope and size.

2.10. UNIT PRICES, SUPPLEMENTAL UNIT PRICES AND ALTERNATES

A. The Bidder shall provide unit prices for the hourly rates for labor and equipment, invoice cost plus percentages mark-ups (materials and subcontractors), and escalation rates (labor and equipment) that reflect the Fair Market Value of the work to be performed.

B. Original invoices for materials and subcontractor cost shall be submitted to OWNER with the respective application for payment.

2.11. CORRECTIONS

Erasures or other changes in the Bids must be explained or noted over the signature of the Bidder.

2.12. TIME FOR RECEIVING BIDS

A. Bids received prior to the advertised hour of opening will be securely kept and sealed. The officer whose duty it is to open them will decide when the specified time has arrived and no Bid received thereafter will be considered. Bidders are solely responsible for delivery to and receipt by the OWNER of bids. The time of receipt will determine the acceptability of mailed bids, regardless of postmark.

B. Bidders are cautioned that while telegraphic modifications of Bids may be received as provided above, such modifications, if not explicit and if in any sense subject to misinterpretation, shall make the Bid so modified, or amended, subject to rejection.

2.13. OPENING OF BIDS

At the time and place fixed for the opening of Bids, the OWNER will cause to be opened and publicly read aloud, every Bid received within the time set for receiving Bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present in person or by representative.

2.14. WITHDRAWAL OF BIDS

Bids may be withdrawn upon written request dispatched by the Bidder in time for delivery in the normal course of business to the time fixed for opening provided that written confirmation of any telegraphic withdrawal over the signature of the Bidder is placed in the mail and postmarked prior to the time set for Bid opening. The Bid Guarantee of any Bidder withdrawing their Bid in accordance with the foregoing conditions will be returned promptly.

2.15. DESCOPING MEETING

All bidders shall be available for a Pre-Bid Award Descope Meeting as may be required by the OWNER. The OWNER reserves the right to descope one or more bidders. Additionally, the meeting minutes of the Descope Meeting shall be enumerated as part of the signed contract agreement. The intent is NOT to renegotiate cost in any manner but to obtain clarifications and details of representations made by the Bidder to assure an understanding of the bid prior to final award.

2.16. AWARD OF CONTRACT; REJECTION OF BIDS

A. The Contract will be awarded to the qualified responsible Bidders submitting bids complying with the conditions of the Invitation for Bids. The Bidders to whom the award is made will be notified at the earliest possible date. The OWNER, however, reserves the right to reject any and all Bids and to waive any informality in Bids received, whenever such rejection or waiver is in its interest.

B. The OWNER reserves the right to consider as unqualified to do the work of general construction, any Bidder who does not habitually perform work with their own forces, the major portions of the work involved in the construction of the improvements embraced in this Site Improvements contract.

C. The OWNER will not award the Contact to any Contractor who is, at the time, ineligible under the provisions of any regulations issued by the Secretary of Labor; United States Department of Labor; or is not qualified under applicable ordinances of the City of Providence or the Laws of the State of Rhode Island. Attention of all Bidders is called to Title 37, Chapter 13, Sections 1-14, General Laws of Rhode Island, 1956, relative to the payment of wages, obligations and charges by Contractors on public works (see GENERAL CONDITIONS PART II, Section 202).

2.17. EXECUTION OF AGREEMENT; PERFORMANCE AND PAYMENT BOND

A. Subsequent to the award within ten (10) days after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the OWNER an Agreement on the form included in the Contract Documents in such number of copies as the OWNER may require.

B. Having satisfied all conditions of award as set forth elsewhere in these documents, the successful Bidder shall, within the period specified in paragraph "A" above, furnish a statutory surety bond in a penal sum not less than the amount of the Contract as awarded, as security for the faithful performance of the Contract and for the payment of all persons, firms or corporations to whom the Contractor may become legally indebted for labor, materials, tools, equipment, or services of any nature including utility and transportation services employed or

used by him in performing the work. Such Bond shall be in the same form as that included in the Contract Documents and shall bear the same date as, or a date subsequent to, that of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bond. This bond shall be signed by a guarantee or surety company listed in the latest issue of the U.S. Treasury Circular 570 and the penal sum shall be within the maximum specified for such company in said Circular 570.

C. The failure of the successful Bidder to execute such Agreement and to supply the required bond or bonds within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the OWNER may grant based upon reasons determined sufficient by the Department of Public Works, shall constitute a default and the OWNER may either award the Contract to the next lowest responsible Bidder, or readvertise for Bids and, may charge against the Bidder the difference between the amount of the Bid and the amount for which a Contract for the work is subsequently executed; irrespective of whether the amount thus due exceeds the amount of the Bid Bond. If a more favorable Bid is received by readvertising, the defaulting Bidder shall have no claim against the OWNER for a refund.

2.18. WAGES AND SALARIES

A. Attention of Bidders is particularly called to the requirements concerning the payment of not less than the prevailing wage and salary rates specified in the Contract Documents and the conditions of employment with respect to certain categories and classifications of employees. See General Conditions, Part II.

B. The rates of pay set forth under General Conditions, Part II, are the minimums to be paid during the life of the Contract. It is therefore the responsibility of Bidders to inform themselves as to local labor conditions, such as length of workday and work week, overtime compensation, health and welfare contributions, labor supply and prospective changes or adjustments of rates.

C. Attention of all Bidders is called to Title 37, Chapter 13, Section I-14 of the General Laws of Rhode Island, 1956, relative to the payment of wages, obligations, and charges by contractors on public works.

D. Prevailing wage rates and Davis-Bacon Wage Determination Reference Materials are available online at https://beta.sam.gov/.

2.19. EQUAL EMPLOYMENT OPPORTUNITY

Attention of Bidders is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin.

2.20. NOTICE TO PROCEED, TIME OF COMPLETION, AND LIQUIDATED DAMAGES

A. The Bidder must agree to commence work on or before a date to be specified in a written Notice to Proceed by the OWNER.

B. The Contractor is required to sign and date four (4) copies of the Notice to Proceed. The Contractor shall keep one copy and return the other three copies to the Department of Public Works, 700 Allens Avenue, Providence, RI, 02905 (2 copies for DPW and 1 copy for City of Providence Recovery Office).

C. The Bidder must agree to commence work on or before a date to be specified in a written Notice to Proceed by the OWNER and to fully complete the project by the indicated completion date. The Bidder will be subject to liquidated damages as indicated in the SPECIAL CONDITIONS, Section 303.

2.21. ITEMS NOT LISTED IN THE BID

Appurtenant items of work shown on the drawings or specified or required to complete the work but not listed separately under the list of items in the Bid shall be included in the cost of payment under the various applicable Bid items of work and no separate payment will be made for such items. It shall be the responsibility of the Contractor to verify any missing or incomplete data.

2.22. BALANCED BIDDING

Minus-bidding on any item or items of the specifications is prohibited. Bids should be made on each separate item of work shown in the Bid (proposal) with reasonable relation to the probable cost of doing the work included in such items; the right is reserved to reject wholly any Bid in case an item or items thereof are obviously unbalanced or appear to the OWNER to be so unbalanced as to affect, or liable to affect adversely any interests of the OWNER. The attention of the Bidder is called to the fact that unbalancing of Bids may adversely affect the Contractor if certain portions of the work are increased or decreased as provided in the Contract Documents.

2.23. PRICES

A. Bidders shall state the proposed price for the work by which the Bids will be compared. This price is to cover all the expenses incidental to the completion of the work in full conformity with the contract specifications and drawings. The price or prices proposed shall be stated both in writing and in figures, and any Bid not so stated may be rejected.

B. If there is a discrepancy between the price written in words, and written in figures, the price written in words shall govern. No bid will be accepted which does not contain a unit or lump sum price for every item contained in the Bid Form.

C. The Contractor shall provide Schedule of Rates for all Labor and Equipment as part of the Bid for the project. This rate table will be used for adjustments in costs in the event they are required.

2.24. UNCERTAINTY OF QUANTITIES

A. Should quantities be listed in an on-call project's scope of work, they are considered approximate and are given only for use in comparing Bids and to indicate approximately the total amount of the contract, and the OWNER does not expressly or by implication represent that the actual amounts of work will even approximately correspond therewith but does call particular attention to the uncertainty in the quantities of the work involved which cannot be predicted in advance. The work under certain items may be materially greater or less than those given in the Bid (proposal) as may be necessary in the judgment of the OWNER to complete the work contemplated in the contract. Attention is particularly called to the fact that the quantity of work to be done under some Bids may be largely dependent on subsurface ground conditions encountered and therefore the quantities of work to be done under the various items may vary substantially from the estimated quantities or may even be omitted.

B. Under the contract, the OWNER reserves the right to increase or decrease the approximate quantities for, or to omit entirely, any of the items as listed in the on-call project request for proposal.

C. Only such quantities of the respective items of work performed and accepted will be paid for. An increase or decrease in the quantity for any item shall not be regarded as ground for an increase or decrease in the Not to Exceed Lump Sum cost proposal.

2.25. CONTRACT

A contract in the form set forth hereinafter will be required to be executed by the successful Bidder

and the OWNER. The attention of all Bidders is, therefore, called to the form of said proposed contract and the provisions thereof.

2.26. WORK ON PRIVATE PROPERTY

Conditions may warrant work on private property due to grade change at a driveway, sidewalk or curb ramp. Work on private property may only occur with instruction from the OWNER.

2.27. CONDITIONS OF WORK

A. Each Bidder must inform himself fully of the conditions relating to the construction and labor under which the work is now or will be performed; failure to do so will not relieve the successful Bidder of their obligation to furnish all required materials, equipment, services, systems, and labor necessary to carry out all of the provisions of the Contract Documents, and to complete the prescribed set forth in their Bid. Insofar as possible, the Contractor, in the carrying out of their work must employ such methods or means as will not cause any reasonable interruption of or interference with traffic, the use of existing facilities and utilities, the use of municipally or State- or privately-owned lands, or with the work being performed by others. The Contractor shall perform the work in accordance with the Drawings and the Traffic Management Plan, as found in the appendices. The Contractor is responsible for any and all additional efforts required to accommodate protections for pedestrians, vehicles and bicycle traffic through the work zone, including providing temporary access routes/ramps that are detectable and include accessibility features consistent with the existing sidewalks, resulting infield conditions created by the means and methods deployed by the Contractor.

B. The Contractor must satisfy himself by their own investigation and research as to the nature and location of the work, the general and local conditions, including but not restricted to those bearing upon underground pipes and structures, subsurface soil conditions including rock and groundwater, transportation, disposal, handling and storage of materials, water, electric power, roads, means of access, the construction and making of connections of the work to existing facilities and utilities, the locations of existing utilities and structures affecting the work, or other similar conditions at the site, the character of equipment and facilities needed preliminary to and during prosecution of the work, requirements of OWNERs and controlling authorities having jurisdiction over the various lands, existing structures, facilities and utilities and all other conditions affecting the work to be done and labor and materials needed, and make their Bid in sole reliance thereon, and shall not at any time after the submission of a Bid assert that there was any misunderstanding in regard to the nature or amount of the work to be done.

2.28. NOTICE OF SPECIAL CONDITIONS

Attention is particularly called to those parts of the contract documents and specifications which deal with the following:

A. Inspection and testing of materials

B. Insurance requirements

C. Wage rates

D. Interpretation of drawings and specifications

E. Test Pits

F. The use of explosives

G. As-built drawings

H. Existing utilities and connections

I. Layout of work

J. Locations of work

K. Schedule of work

L. Salvageable materials

M. Construction schedule

N. Preconstruction conference

O. Occupational Safety and Health Standards (OSHA) required PPE shall be provided by the Contractor as part of their costs, as well as any PPE Requirements related to Covid-19.

P. The Contractor shall submit a Life and Safety Plan prior to the execution of the Work including the Contractor's COVID-19 Plan

Q. Environmental

2.29. LAWS AND REGULATIONS

The Bidder's attention is directed to the fact that all applicable Federal and State laws, municipal ordinances and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included as if they are attached and written in full.

2.30. DEFINITIONS

OWNER: The term "OWNER" means the City of Providence (City), and the Department of Public Works (DPW) which are authorized to undertake this contract.

2.31. SEQUENCE OF CONSTRUCTION

The Contractor shall schedule their operations so as to minimize delays and inconvenience to traffic and shall at all times cooperate with the City of Providence, Parks Department, Department of Public Properties, Police and Fire Departments, the Traffic Engineering Department and the Department of Planning & Development and their appointed representatives. The Contractor shall also cooperate with the Department of Public Works, Rhode Island Department of Transportation, Providence Water, Narragansett Bay Commission, Rhode Island Energy, Rhode Island Public Transit Authority (bus stops and route impacts) and other private companies. The Contractor shall submit their proposed "Sequence of Construction" to the Engineer and OWNER for approval before commencing work and shall be flexible in revising the "Sequence of Construction" to meet the OWNER's needs.

2.32. TITLE 37 - CHAPTER 13 (LABOR AND PAYMENT OF DEBTS BY CONTRACTORS – GENERAL LAWS OF RI, 1956, AS AMENDED)

Title 37 - Chapter 37-13 of the General Laws of RI, 1956, as amended, shall be considered part of this Contract as if attached and written in full.

2.33. PROVIDENCE CODE OF ORDINANCES – SECTION 21.28.1. QUALIFICATIONS OF PARTIES DOING BUSINESS WITH THE CITY.

The Contractor shall comply fully with this Section as if attached and written in full (https://library.municode.com/ri/providence/codes/code_of_ordinances)

2.34. INSTRUCTIONS TO BIDDERS

Instructions to Bidders are contained in the Instructions to Bidders Section, of which this Article is hereby made part of. When the provisions of the Contract Documents are changed by this Article, the portion modified is referred to by number. Unchanged portions and other provisions remain intact.

2.35. BID SECURITY

Bid Security shall be in the amount stated in the Board of Contract and Supply CONSTRUCTION & SERVICE CONTRACT BID TERMS and INVITATION FOR BIDS and shall be: Bid Bond naming the City of Providence as Obligee.

2.36. PRE-BID CONFERENCE

Refer to the Request for Proposals for further information.

2.37. BIDDING REQUIREMENTS

A. Attention is particularly called to those parts of the Contract Documents and Specifications dealing with the following:

1. Non-Collusive Affidavit
2. Insurance Requirements
3. Wage Rates
4. Required State Certifications
5. Requirements for Affirmative Action
6. Federal Procurement Regulations
7. Minority Employment and EEO Compliance
8. Special Requirement for All Out-of-State Contractors and Firms
9. First Source List
10. Miscellaneous/Notifications/Required License
11. City of Providence Code of Ordinances, Chapter 21, Article II, Section 21-52. Minority and Women Business Enterprise
12. City of Providence Code of Ordinances, Chapter 21, Article II, Section 21-28.1. Qualifications of parties doing business with the OWNER.

B. The Bidder is specifically advised that any person or firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the OWNER.

2.38. REQUIRED BID DOCUMENTS

The following documents must be fully executed on the special forms provided herein and must accompany all bids:

A. Purchasing Department Documents and MBE/WBE Participation Forms

B. Certificate of Corporate Principal

C. Non-Collusion Affidavit of Prime Bidder

D. Certification of Non-Segregated Facilities

E. Bidder's Certification for Equal Employment Opportunity

F. Special Requirement for All Out-of-State Contractors and Firms

G. Certification with Regard to Performance of Previous Contracts and Subcontracts

H. Affidavit of Non-Discrimination

I. Certification of Non-Discrimination in Equal Employment Opportunity

J. Statement of Bidders Qualifications

K. Proposed Subcontractors

L. Schedule of Unit Prices

2.39. CERTIFICATE OF NON-SEGREGATED FACILITIES

All contractors should be aware of the Certification of Non-Segregated Facilities which is part of the Bid proposal.

2.40. CERTIFICATION WITH REGARD TO PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE

In general, this certificate refers to Standard Form 100, which is an annual form submitted by certain contractors to the U.S. Department of Labor. Contractors should refer to the Federal Procurement Regulations for a more thorough explanation of this report.

2.41. SUBMISSION OF STANDARD FORM 257

Bidders shall be advised that the contractor who is awarded the Contract will be required to submit to the Department of Labor Form 66 and the Minority Manpower Utilization Report. This report will be completed for the OWNER on the fifth day of each month for work done the preceding month. This report is required of not only the prime contractor, but all subcontractors and must reflect minority manpower utilization for all work done in the State during the performance of this Contract.

2.42. MISCELLANEOUS / NOTIFICATIONS

A. The Contractor shall notify "Dig-Safe" and all public and private utility companies for confirmation and layout of utility locations prior to the commencement of work.

City-Owned utilities such as but not limited to drainage, sewers, traffic signal and street lighting infrastructure are NOT PART of the DIG SAFE program in Providence and are not marked by the City of Providence. Contractors are urged to exercise due diligence and review

handholes, manholes, fixtures and other visual clues that underground utilities exist in the Work Zone that may not be located and marked by Dig Safe. This effort may require observing underground structures by removing manhole and handhole covers to observed depths and direction of utilities. Additionally, the Providence Department of Public Works does have a limited library of public utilities and roadway information on file. This information can be obtained by contacting the Engineering Division at DPW.

B. Refer to the Contract Specifications for Additional Requirements.

C. The Contractor shall verify all dimensions and accurately locate the property boundary and Limit-of-Work lines to the satisfaction of the OWNER prior to the commencement of work.

D. As of May 18, 1995, all contractors proposing to execute work within the public right-of-way in the City of Providence must obtain an annual sidewalk license through the Providence Department of Public Works, 700 Allens Avenue, Providence, RI. The annual license fee is $100.00, to be paid by the Contractor.

E. The Contractor shall be back charged for at actual costs to correct issues resulting from not failure to perform this task and required timely notifications of work. The Contractor will not be eligible for extensions in time for failure to comply.

F. Project layout and the highest standards of execution for the project is extremely important. All methods and materials will be approved in advance of the execution of work. The Contractor, OWNER and the Engineer Inspector and Project Manager shall agree on a project schedule, acceptable work schedule and schedule of approvals in advance of any work or action taken on the site and delivery of materials.

G. Contractors and Subcontractors shall provide all the qualified and skilled labor required to meet the quality level expected for this project. If the OWNER determines that the Contractor is not providing the labor and skill required he/she will be required to immediately provide new personnel or Subcontractor for said skill acceptable to the OWNER to replace unacceptable sections/areas and continue the project.

H. Work deemed unacceptable during the course of the work will be cause for the OWNER to reasonably withhold payments for work completed to-date until acceptability is achieved and required work is properly corrected. The contractor shall not proceed to new work until work done to-date is acceptable.

2.43. HOLDING OF BIDS

A. Bids may be held by the OWNER for a period not to exceed ninety (90) days from the date of Opening of Bids, for the purpose of reviewing of bids and investigating the qualifications of bidders, all prior to award of Contract.

2.44. AWARD OF CONTRACT / START OF CONSTRUCTION

A. The CONTRACT for construction is expected to be awarded on March 27, 2023, although this is subject to change. The Board of Contract and Supply may take up to 60 days to formally award the Contact and the Contract shall commence work within 90 days of Contract Award unless otherwise agreed to in writing.

B. CONTRACTOR shall commence construction within ten (10) calendar days of issuance of NOTICE-TO-PROCEED. The Contractor shall have made application for required bonds no later than the day after Contract Award. The City reserves the right to issue notices to proceed in phases.

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3. REQUIRED BIDDING DOCUMENTS

LIST OF FORMS:

The following forms must be completed and signed by the bidder and included with the bid. Failure to execute any form, or portion thereof may lead to disqualification of a bid. Blank copies of the forms are included in the Appendix.

1. Form of Bid
2. Purchasing Department Documents and MBE/WBE Participation Forms
3. Certificate of Corporate Principal
4. Non-Collusion Affidavit of Prime Bidder
5. Certification of Non-Segregated Facilities
6. Bidder's Certification for Equal Employment Opportunity
7. Special Requirement for All Out-of-State Contractors and Firms
8. Certification with Regard to Performance of Previous Contracts and Subcontracts
9. Affidavit of Non-Discrimination
10. Certification of Non-Discrimination in Equal Employment Opportunity
11. Statement of Bidders Qualifications
12. Proposed Subcontractors
13. Schedule of Unit Prices

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4. CONTRACT FORMS

Copies of the following contract forms are included in the Appendix.

LIST OF FORMS

A. Construction Agreement

B. Partial Release

C. Final Release

D. Contract Bond for Complete Performance and Full Payment

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5. GENERAL CONDITIONS

5.1. BRIEF SCOPE OF WORK

City of Providence desires to solicit competitive proposals from responsible vendors to provide both emergency and non-emergency on-call sewer and drainage repair and rehabilitation services for the Department of Public Works (DPW), for a three-year period.

The Contractor will provide services as indicated in INVITATION FOR BIDS.

5.2. DEFINITIONS

Whenever used in any of the Contract Documents, the following meanings shall be given to the terms defined:

A. Addendum: The term "Addendum" or "Addenda" means any changes, revisions or clarifications of the Contract Documents which have been duly issued by the OWNER to prospective Bidders prior to the time of receiving Bids.

B. Contract: The term "Contract" means the Contract executed by the OWNER and the Contractor, of which these GENERAL CONDITIONS form a part.

C. Contract Documents: The term "Contract Documents" means and shall include the following: Executed Agreement, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Condition, Special Conditions, Technical Specifications, and Drawings (as listed in the Schedule of Drawings).

D. Contractor: The term "Contractor" means the person, firm or corporation entering into the Contract with the OWNER to construct and install the improvements embraced in this Contract.

E. Drawings: The term "Drawings" means the drawings listed in the Schedule of Drawings.

F. Engineer: The term "Engineer" means any qualified person or persons, employed by the Local Public Agency for the purpose of directing or having in charge the work of Site Improvements embraced in this Contract, the said Engineer acting directly or indirectly through any Assistant Engineer having general charge of the work or through any assistant having immediate charge of a portion thereof limited by the particular duties entrusted to him.

G. Local Government: The term "Local Government" means the City of Providence, Rhode Island, within which the Project Area is situated.

H. OWNER: The term "OWNER" means the CITY OF PROVIDENCE, and the THE CITY OF PROVIDENCE DEPARTMENT OF PUBLIC WORKS (DPW) which are authorized to undertake this Contract.

I. Project Area: The Project Area shall be considered the City of Providence boundaries.

J. Technical Specifications: The term "Technical Specifications" means that part of the Contract Documents which describes, outlines and stipulates: the quality of the materials to be furnished; the quality of workmanship required; and the methods to be used in carrying out the construction work to be performed under this Contract.

K. Wherever in the specifications or upon the contract drawings the words directed, required, permitted, ordered instructed, designated, considered necessary, or words of like import are used, it shall be understood that the direction, requirement, permission, order, instructions,

designation or decision of the Engineer is intended; where as shown, as indicated, as detailed or words of similar import are used, it shall be understood that reference to the drawings accompanying these specifications is made unless otherwise stated; and similarly the words approved, acceptable, satisfactory, or words of like import shall mean approved by, or acceptable, or satisfactory to the Engineer. As used herein "provided" shall be understood to mean "provided complete in place", that is "furnished and installed complete".

5.3. SUPERINTENDENCE BY CONTRACTOR

A. Except where the Contractor is an individual and gives their personal superintendence to the work, the Contractor shall provide a competent Superintendent and/or Project Manager, dedicated to the project and satisfactory to the OWNER and the Engineer, on the work at all times during working hours with full authority to act on behalf of the Contractor. The Contractor shall also provide an adequate staff for the proper coordination and expediting of their work.

B. The Contractor shall lay out their own work and shall be responsible for all work executed under the Contract. The Contractor shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from failure to do so.

5.4. SUBCONTRACTS

A. The Contractor shall not execute an agreement with any Subcontractor or permit any Subcontractor to perform any work included in this contract until they have submitted a non-collusion affidavit from the Subcontractor and have received written approval of such Subcontractor from the OWNER. (See Non-Collusion Affidavit for Subcontractor in Bidding Documents section)

B. No proposed Subcontractor shall be disapproved by the OWNER except for cause.

C. The Contractor shall be as fully responsible to the OWNER for the acts and omissions of their Subcontractors, and of persons either directly or indirectly employed by them as they are for the acts and omissions of persons directly employed by them.

D. The Contractor shall cause appropriate provision to be inserted in all subcontracts relative to the work to require compliance by each Subcontractor with the applicable provisions of the Contract for the improvements embraced in the Site Preparation.

E. Nothing contained in the Contract shall create any contractual relation between any Subcontractor and the OWNER.

F. The Contractor shall have full control over their Subcontractors to deliver the project and/or elements of the project allowing he Contractor to perform the work timely. The Contractor shall not permit any Subcontractor from holding up the project due to unavailability or not wanting to perform small sections of Work. If a Subcontractor is not able to perform work in a timely manner, the Contractor shall replace them with a replacement Subcontractor approved by the OWNER.

G. The Contractor shall provide complete sets of items, such as, but not limited to, Contracts, Specifications, Drawings, Sketches and other applicable documents for both office and field use.

5.5. OTHER CONTRACTS

The OWNER may award, or may have awarded, other contracts for additional work, and the Contractor shall cooperate fully with such other Contractor, by scheduling their own work with that to be performed under other Contracts as may be directed by the OWNER. The Contractor shall not commit or permit any act, which will interfere with the performance of work by any other Contractor as scheduled.

5.6. FITTING AND COORDINATION OF THE WORK

The Contractor shall be fully responsible for the proper fitting of all work and for the coordination of the operations of all trades, Subcontractors, or materialmen engaged upon this Contract. The Contractor shall be prepared to guarantee to each of their Subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

5.7. MUTUAL RESPONSIBILITY OF CONTRACTORS

If, through acts or neglect on the part of the Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the work, the Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration, if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against the OWNER on account of any damage alleged to have been so sustained, the OWNER will notify this Contractor, who shall defend at their own expense any suit based upon such claim, and, if any judgment or claims against the OWNER shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connections therewith.

5.8. PROGRESS SCHEDULE

The Contractor shall submit for approval immediately after execution of the Agreement, a carefully prepared Cost Loaded Progress Schedule (in PDF and Native Format), showing the proposed dates of starting and completing each of the various sections of the work, the anticipated monthly payments to become due the Contractor, and the accumulated percent of progress every two weeks Every two weeks, the Contractor shall update and submit the progress schedules for review by the OWNER. Failure to maintain the progress schedule will be cause to withhold payments due to the Contractor.

5.9. COMPENSATION AND PAYMENTS TO CONTRACTOR

A. Compensation:

1. The OWNER will pay and the Contractor shall receive as full compensation for all work completed to date according to the conditions of these Contract Documents

2. The Contractor shall not be paid for materials in storage.

3. The amount of the Contract (accepted bid prices) listed in the Bid is based on the estimated quantities and the unit and/or lump sum bid prices as set forth in the Bid. Actual work may result in greater or lesser quantities estimated. It is understood and agreed that the Contractor will accept as payment the actual measured quantities at the unit and/or lump sum bid prices as set forth in the accepted bid and may be considered for an adjustment as prescribed in accordance with the terms outlined in Section 109 hereof.

4. The estimated quantities given in the Bid (proposal) for the various items of work are given for the purpose of comparing proposals offered for the work under this contract and if it is found in the performance of the contract work that any or all of the said estimated quantities are not even approximately correct, the Contractor shall have no claim for anticipated profits, or for loss of profits or for increase in prices as listed in the accepted Bid because of the difference between the quantities of the various items of work actually done and the estimated quantities stated in the accepted Bid (proposal) except as provided for in Section 109 hereof.

5. It is understood that, except as otherwise specifically stated in the contract documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to protect, execute,

complete and deliver the work within the specified time.

6. Any work necessary to be performed after regular working hours, on Saturdays, Sundays and legal holidays, shall be performed by the Contractor without additional expense to the OWNER.

7. Night work or work on Saturdays, Sundays and legal holidays shall be done only with the approval of the Providence Traffic Engineering Department or as specified in the Contract Documents.

B. Partial Payments:

1. The Contractor shall prepare their requisition for partial payment monthly, at a date to be specified by the OWNER, and submit it digitally in a PDF and unlocked Excel document formats, to the Engineer for their approval. The amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting (1) five percent (5%) of the total amount, to be retained until final payment and (2) the amount of all previous payments. If the Contractor is from out of state, the five percent retainage shall be increased to eight percent (8%) (refer to RIGL 44-1-6). The total value of work completed to date shall be based on the actual quantities of work completed and on the unit prices contained in the agreement. For lump sum items the value of the work completed to date will be based on the actual amount of the work done and the schedule required to be submitted by the Contractor in Section 108. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be available for inspection by the Engineer and OWNER.

2. Monthly or partial payments made by the OWNER to the Contractor are monies advanced for the purpose of assisting the Contractor to expedite the work of construction. The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the OWNER. The Contractor shall obtain additional insurance for stockpiled materials within the project site. Such payments shall not constitute a waiver of the right of the OWNER to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the OWNER in all details.

3. THE OWNER, PRIOR TO MAKING EACH PAYMENT TO THE CONTRACTOR, shall require the Contractor to furnish releases or receipts from any or all persons / firms performing work and supplying material or services to the Contractor, or any Subcontractor, if this is deemed necessary to protect its interest. Additionally, the Contractor may be required to submit certified payrolls for any and all employees, including Subcontractors.

C. Final Payment:

1. After final inspection and acceptance by the OWNER of all work under the Contract, the Contractor shall prepare their requisition for final payment which shall be based upon the carefully measured or computed quantity of each item of work at the applicable unit prices stipulated in the Agreement. The total amount of the final payment due the Contractor under this contract shall be the amount computed as described above less all previous payments. Final payment to the Contractor shall be made subject to their furnishing the OWNER with a release in satisfactory form of all claims against the OWNER arising under and by virtue of their contract, other than such claims, if any as may be specifically excepted by the Contractor from the operation of the release as provided under Section 113 hereof.

2. The Contractor shall retain consent of surety. This shall be submitted at the time of the

final Payment requisition.

3. The OWNER, before paying the final estimate, may require the Contractor to furnish releases or receipts from all Subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project) and services to the Contractor, if the OWNER deems the same necessary in order to protect its interest. The OWNER, however, may if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments so made shall in nowise impair the obligations of any surety or sureties furnished under this Contract.

4. Withholding of any amount from the OWNER under Section 303, entitled "Liquidated Damages", under SPECIAL CONDITIONS, shall be deducted from the final payment due the Contractor.

D. Withholding Payments:

1. The OWNER may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the OWNER and if it so elects may also withhold any amounts due from the Contractor to any Subcontractors or material dealers, for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the OWNER and will not require the OWNER to determine or adjust any claims or disputes between the Contractor and their Subcontractors or material dealers, or to withhold any monies for their protection unless the OWNER elects to do so. The failure or refusal of the OWNER to withhold any monies from the Contractor shall in nowise impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

(a) Certified Payroll

(b) WBE and DBE

(c) Liens Releases

(d) Supporting information to review invoices

(e) Incomplete Work

(f) Not Addressing REAL TIME Punch lists

E. Payments Subject to Submission of Materials Certificates and Materials Testing:

1. Each payment to the Contractor by the OWNER shall be made subject to submission by the Contractor of all written certifications required of him and their Subcontractors. Materials and associated bid items found to be deficient by the City’s third-party testing agency will not be paid until defective materials have been replaced.

F. Payments Subject to Reporting Requirements:

1. Each payment to the Contractor by the OWNER shall be made after satisfactory reporting is submitted for First Source, Apprenticeship Utilization, MBE/WBE utilization and any other reporting as stated at the pre-construction meeting. Payment to the Contractor by the OWNER is also contingent upon receipt of updated and accurate project construction schedules.

G. Payments Subject to Certified Payroll Requirements:

1. Complete and executed certified payroll statements are required to be submitted with all

invoice requests. Failure to do so will result in non-payment until certified payrolls are received.

H. Payments Subject to Progress Schedule

1. Each payment to the Contractor by the OWNER shall be made subject to submission of a current, accurate and reasonable progress schedule. Failure to do so will result in non-payment until a progress schedule is received and accepted.

5.10. CHANGES IN THE WORK

A. The OWNER may make changes in the scope of the work required to be performed by the Contractor under the Contract or making additions thereto, or by omitting work therefrom, without invalidation of the Contract, and without relieving or releasing the Contractor from any of their obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is expressly provided otherwise.

B. Except for the purpose of affording protection against any emergency endangering health, life, limb or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the OWNER authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless so ordered.

C. If applicable unit prices are contained in the Agreement (established as a result of either a unit price bid or a Supplemental Schedule of Unit Prices) the OWNER may order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the applicable unit prices specified in the Contract; provided that in case of a unit price contract the net value of all changes does not increase or decrease the original total amount shown in the Agreement by more than twenty-five percent (25%) in accordance with the Section entitled Unit Prices, under INSTRUCTIONS TO BIDDERS.

D. If applicable unit prices are not contained in the Agreement or if the total net change increases or decreases the total Contract Price more than twenty-five percent (25%) the OWNER shall, before ordering the Contractor to proceed with desired changes, request an itemized proposal from him covering the work involved in the change after which the procedure shall be as follows:

1. If the proposal is acceptable, the OWNER will prepare the change order in accordance with Paragraph E below for acceptance by the Contractor, and

2. If the proposal is not acceptable and prompt agreement between the two parties cannot be reached, the OWNER may order the Contractor to proceed with the work on a cost-plus- limited basis, defined as the net cost of the Contractor's labor, materials and insurance plus fifteen percent (15%) of said net cost to cover overhead and profit, the total cost not to exceed a specified limit.

E. Each change order shall include in its final form:

1. A detailed description of the change in the work.

2. The Contractor's proposal (if any) or a conformed copy thereof.

3. A definite statement as to the resulting change in the contract price and/or time.

4. The statement that all work involved in the change shall be performed in accordance with

Contract requirements except as modified by the change order.

5.11. CLAIMS FOR EXTRA COST

A. If the Contractor has any claims for additional cost or extension of time, they shall, within three days after the occurrence of the claim, and in any event before proceeding to execute the work, submit their claim in writing to the OWNER, stating clearly in detail the basis of the claim. No such claim will be considered unless so made.

B. Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or benchmarks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.

C. Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall at once be reported to the OWNER and work shall not proceed except at the Contractor's risk, until written instructions have been received by him from the OWNER.

D. If, on the basis of the available evidence, the OWNER determines that an adjustment of the Contract Price and/or Time is justifiable, the procedure shall be as provided in Section 109 hereof.

5.12. TERMINATION, DELAYS, AND LIQUIDATED DAMAGES

A. Termination of Contract: If the Contractor or any of their Subcontractors refuses or fails to prosecute the work with such diligence as will ensure its completion within the time specified in these Contract Documents, or as modified as provided in these Contract Drawings, or violates any other Provisions of this Contract, the OWNER, by written notice to the Contractor, may terminate the Contractor's right to proceed with the work. Upon such termination, the OWNER may take over the work and prosecute the same to completion, by contract or otherwise, and the Contractor and their sureties shall be liable to the OWNER for any additional cost incurred by the OWNER in its completion of the work and they shall also be liable to the OWNER for liquidated damages for any delay in the completion of the work as provided below. If the Contractor's right to proceed is so terminated, the OWNER may take possession of and utilize in completing the work such materials, tools, equipment, and plant as may be on the site of the work and necessary therefor.

B. Liquidated Damages for Delays: If the work is not completed within the time stipulated in the SPECIAL CONDITIONS, Section 302, including any extensions of time for excusable delays as herein provided, the Contractor shall pay to the OWNER as fixed, agreed, and liquidated damages for each calendar day of delay, until the work is completed, the amount as set forth in SPECIAL CONDITIONS, Section 303, and the Contractor and their sureties shall be liable to the OWNER for the amount thereof.

C. Excusable Delays: An excusable delay is defined as a delay to the Contract or Milestone/phase completion date which was unforeseeable and beyond the Contractor’s control and not caused by the Contractor’s fault or negligence and for which a Contract or Milestone time extension may be granted by the OWNER. Excusable delays include the following:

1. Acts of the Government, including controls or restrictions upon or requisitioning of materials, equipment, tools, or labor by reason of war, National Defense, or any other national emergency;

2. Acts of the OWNER;

3. Causes not reasonably foreseeable by the parties to this Contract at the time of the execution of the Contract which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to acts of God or of the public enemy, acts of another Contractor in the performance of some other contract with the OWNER, fires, floods, epidemics, pandemics, quarantine, restriction, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions; and

4. Any delay of any Subcontractor occasioned by any of the causes specified in subparagraphs (1), (2) and (3) of this paragraph "C". Provided, however, that the Contractor promptly notify the OWNER within three (3) days in writing of the cause of the delay. Upon receipt of such notification the OWNER shall ascertain the facts and the cause and extent of delay. If, upon the basis of the facts and the terms of this contract, the delay is properly excusable, the OWNER shall extend the time for completing the work for a period of time commensurate with the period of excusable delay.

5.13. ASSIGNMENT OR NOVATION

The Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the OWNER's sole discretion.

5.14. DISPUTES

A. Disputes to be resolved in accordance with the Rhode Island General Law Tittle 37, Chapter 37-16 et seq.

B. All claims, disputes, and other matters in question arising out of or relating to this contract or the performance or interpretation thereof shall be submitted to arbitration. Arbitration shall be commenced by a demand in writing made by one party to the contract upon the other within a reasonable time after the dispute, claim, or other matter in question arose but in no event after payment in full of the contract price has been made and accepted. The written demand shall contain a statement of the question to be arbitrated and a detailed statement of each item or matter in dispute and the name of the arbitrator appointed by that party. The other party to the contract within ten (10) days of the receipt of the written demand shall appoint an arbitrator and give notice in writing thereof to the party who commenced arbitration. The two (2) arbitrators appointed by the parties shall within ten (10) days of the date of the appointment of the second arbitrator select a third arbitrator who shall be designated as chairperson and who immediately shall give written notice to the parties of their appointment. The third arbitrator shall select a time, date, and place for hearing and give each party five (5) days notice in writing thereof. The date for hearing shall not be more than fifteen (15) days after the date of appointment of the third arbitrator. The award shall be made promptly by the arbitrators and, unless otherwise agreed by the parties or specified by law, no later than thirty (30) days from the date of closing the hearing, or, if oral hearings have been waived, from the date of the transmittal of the final statements and proofs to the arbitrators. The award shall be in writing and shall be signed by a majority of the arbitrators. It shall be executed in the manner required by law. The arbitrator shall provide a written explanation of the reasoning for the award. In the event the party of whom arbitration is demanded shall fail to appoint their arbitrator within the time specified or the two (2) arbitrators appointed by the parties are unable to agree on an appointment of the third arbitrator within the time specified, either party may petition the presiding justice of the superior court to appoint a single arbitrator who shall hear the parties and make an award as provided herein. The petitioner shall give five (5) days notice in writing to the other party before filing their petition.

5.15. TECHNICAL SPECIFICATIONS AND DRAWINGS

Anything mentioned in the Technical Specifications and not shown on the Drawings or shown on the Drawings and not mentioned in the Technical Specifications, shall be of like effect as if shown on or mentioned in both. In case of any difference or discrepancy in Drawings or Technical Specifications, the matter shall be immediately submitted to the OWNER, without whose decision, said difference/discrepancy shall not be adjusted by the Contractor, save only at their own risk and expense.

5.16. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

It shall be the responsibility of the Contractor to make timely requests of the OWNER for any additional information not already in their possession which should be furnished by the OWNER under the terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. The additional drawings and instructions thus supplied to the Contractor will coordinate with the Contract and instructions thus supplied to the Contractor will coordinate with the Contract Documents and will be so prepared so that they can be reasonably interpreted as part thereof. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions. The Contractor and the Engineer will prepare jointly a schedule, fixing the dates at which special detail drawings will be required, such drawings if any, to be furnished by the Engineer in accordance with said schedule, and a schedule fixing the respective dates for the submission of shop drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment, and the completion of the various parts of the work; each such schedule to be subject to change from time to time in accordance with the progress of the work. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in their work or to others arising from their failure to comply fully with the provisions of this Section.

5.17. SHOP DRAWINGS

A. The Contractor shall submit promptly to the Engineer each shop drawing, machinery or equipment details, layout drawings, or setting drawing, etc., prepared in accordance with the schedule predetermined as aforesaid. After examination of such drawings by the Engineer and returned approval/denial, the Contractor shall make such corrections to the drawings as have been indicated and shall submit new shop drawings. Regardless of corrections made in or approval given to such drawings by the Engineer, the Contractor will nevertheless be responsible for the accuracy of such drawings and for their conformity to the drawings and specifications, unless they notify the Engineer in writing of any deviations at the time they furnish such drawings.

B. The Contractor is required to have a portal to provide the OWNER access to shop drawing documents. The portal shall be maintained for five years. The OWNER shall be afforded administrative access. Five (5) seats shall be provided to the OWNER.

C. Shop drawings of all fabricated work shall be submitted to the Engineer for approval and no work shall be fabricated by the Contractor save at their own risk until approval has been given.

D. The Contractor shall submit all shop and setting drawings and dates sufficiently in advance of requirements to enable the Engineer ample time for checking same, including time for correction, resubmission and recheck if necessary, and no claim for delay will be granted the Contractor by reason of their failure in this respect.

E. All shop drawings submitted must bear the stamp of approval of the Contractor as evidence that the Drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmission. If the shop drawings show variations from the requirements of the Contract Documents because of standard shop practice or other reason, the Contractor shall make specified mention of such variation in their letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the contract documents even though such shop drawings have been approved.

F. Where shop drawings are submitted by the Contractor that indicate a departure from the Contract which the Engineer deems to be a minor adjustment in their interest and not involving a change in the Contract price or extension of time, the Engineer may approve the drawings by the approval will contain, in substance, the following:

The modification shown on the attached drawings is approved in the interest of the OWNER to affect an improvement for the Project and is ordered with the understanding that it does not involve any change in the Contract price or time; that it is subject generally to all Contract stipulations and covenants; and that it is without prejudice to any and all rights of the OWNER under the contract and surety bond or bonds.

G. The approval of shop drawings will be general and shall not relieve the Contractor from the responsibility for adherence to the Contract nor shall it relieve him of the responsibility for any error which may exist.

H. The Contractor agrees to hold the Engineer and the OWNER harmless and defend them against damages or claims for damages arising out of injury to others or property of third persons which result from errors on shop, working or setting drawings whether or not the same have been approved by the Engineer and/or the OWNER.

5.18. MATERIALS AND WORKMANSHIP

A. Unless otherwise specifically provided for in the Technical Specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the Technical Specifications as "equal to" any particular standard, the Engineer shall decide the question of equality. Whenever a material or article required is specified or shown on the drawings by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design may be considered equal and satisfactory providing the material or article so proposed is of equal substance and function in the opinion of the Engineer. It shall not be purchased or installed without their written approval. In all cases, new material shall be used in the project. If two or more brands, makes or material, devices or equipment are shown or specified, each should be regarded as the approved equal of the other. Any other brand, make of material, device or equipment, which in the opinion of the Engineer or their authorized agent, is the recognized approved equal of that specified, considering quality, workmanship and economy of operation and is suitable for the purpose intended, may be accepted.

B. The Contractor shall furnish to the OWNER for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work.

C. Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

D. Materials specified by reference to the number or symbol of a specific standard, such as an A.S.T.M. Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof any amendment or supplement thereto in effect on the date of the invitation for Bids, except as limited to type, class or grade, or modified in such reference. The Standards referred to, except as modified in the Technical Specifications shall have full force and effect as though printed therein.

E. The OWNER may require the Contractor to dismiss from the work such employee or employees as the OWNER or the Engineer may deem incompetent, or careless, or insubordinate.

5.19. SAMPLES, CERTIFICATIONS AND TESTS

A. The Contractor shall submit all material or equipment samples, certificates, affidavits, etc., as called for in the Contract Documents, or required by the Engineer, promptly after award of the Contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the Contract time.

B. Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with Contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

C. Approval of any materials shall be general only, and shall not constitute a waiver of the OWNER’s right to demand full compliance with the Contract Documents after actual deliveries, the Engineer will have such check tests made as they deem necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable.

D. Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

1. The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the Engineer or testing agency, however, the Contractor shall cooperate with and assist the Engineer or testing agency in the taking of samples on the project where the taking of samples is deemed necessary by the Engineer.

2. The Contractor shall assume all costs of retesting materials which fail to meet contract requirements. The Contractor shall assume all costs of testing materials offered in substitution for those found deficient. All other expenses for testing of materials will be paid for by the OWNER.

E. Testing and inspection of the various materials, equipment, or articles, etc., heretofore mentioned shall be performed by testing agency or agencies selected by the OWNER.

F. Payments to the testing agency or agencies shall be paid for by the Local OWNER.

5.20. PERMITS AND LICENSES

A. The Contractor shall give all notices required by and comply with all applicable laws, ordinances, standard requirements, and codes of the Local Government. All construction work and/or utility installation shall comply with all applicable ordinances, standard requirements, and codes including all written waivers. Before installing any work, the Contractor shall examine the Drawings and Technical Specifications for compliance with applicable ordinances, standard requirements and codes and shall immediately report any discrepancy to the OWNER. Where the requirements of the Drawings and Technical Specifications fail to comply with such applicable ordinances, standard requirements, or codes, the OWNER will adjust the Contract by Change Order to conform to such ordinances, standard requirements, or codes (unless waivers in writing covering the difference have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated prices. Should the Contractor fail to observe the foregoing provisions and proceed with the construction and/or install any utility at variance with any applicable ordinance, standard requirement, or code, including any written waivers (notwithstanding the fact that such installation is in compliance with the Drawings and Technical Specifications), the Contractor shall remove such work without cost to the OWNER, but a Change Order will be issued to cover only the excess cost the Contractor would have been entitled to receive if the change had been made before the Contractor commenced work on the items involved.

B. The Contractor shall, at their own expense, secure and pay to the appropriate department of the Local Government the fees or charges for all permits for street pavement, sidewalks, sheds, removal of abandoned water taps, sealing of house connection drains, pavement cuts, buildings, electrical, plumbing, water, gas and sewer permits required by the local regulatory body or any of its agencies. The required permits shall be those set forth in SPECIAL CONDITIONS, Section 6.66.

C. The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris and rubbish on or off the Project Area and commit no trespass on any public or private property in any operation due to or connected with the Improvements embraced in this Contract.

5.21. CARE OF WORK

A. The Contractor shall be responsible for all damages to person or property that occur as a result of their fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the OWNER.

B. The Contractor shall provide at their own expense sufficient competent watchmen, both day and night, including Saturday, Sundays, and holidays, from the time the work is commenced until final completion and acceptance.

C. In an emergency affecting the safety of life, limb or property, including adjoining property, the Contractor, without special instructions or authorization from the OWNER, is authorized to act at their discretion to prevent such threatened loss or injury, and he shall so act. He shall likewise act if instructed to do so by the OWNER. Any compensation claimed by the Contractor on

account of such emergency work will be determined by the OWNER as provided in the GENERAL CONDITIONS, PART 1, Section 109.

D. The Contractor shall avoid damage as a result of their operations to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc., and he shall at their own expense completely repair any damage thereto caused by their operations.

E. The Contractor shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the Improvements embraced in this Contract. The Contractor shall be responsible for giving of any and all required notices to any adjoining or adjacent property OWNER or other party before the commencement of any work. The Contractor shall indemnify and save harmless the OWNER from any damages on account of settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the OWNER may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

5.22. ACCIDENT PREVENTION AND JOB SAFETY

A. The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of their prosecution of the work. The safety provisions of applicable laws and building and construction codes shall be observed and the Contractor shall take or cause to be taken such additional safety and health measures as the OWNER may determine to be reasonable necessary. Further, the Contractor shall comply, and shall cause all Subcontractors to comply with all applicable provisions of the U.S. Department of Labor "Williams-Steiger Occupational Safety and Health Act of 1970."

B. The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the OWNER with reports concerning these matters.

C. The Contractor shall indemnify and save harmless the OWNER and the Engineer from any claims for damages resulting from property damage, personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this contract.

D. Upon execution of the Contract, the Contractor shall provide their Safety Program to the OWNER.

5.23. SANITARY FACILITIES

A. The Contractor shall furnish, install, and maintain ample sanitary facilities for the workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the State and Local Government. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

B. Sanitary facilities shall not be placed in the public right-of-way.

5.24. USE OF PREMISES

A. The Contractor shall confine their equipment, storage of materials, and construction operations to the Contract Limits as shown on the Drawings and as prescribed by ordinances or permits, or as may be desired by the OWNER, and shall not unreasonably encumber the site or public rights-of-way with their materials and construction equipment.

B. The Contractor shall comply with all reasonable instructions of the OWNER and the ordinances and codes of the Local Government, regarding signs, advertising, traffic, fires, explosives, danger signals and barricades.

C. The Contractor is not permitted to store equipment or stockpiles in the public right-of-way.

5.25. REMOVAL OF DEBRIS, CLEANING, ETC.

The Contractor shall, periodically or as directed during the progress of the work, remove and legally dispose of all surplus excavated material and debris, and keep the Project Area and public rights-of-way reasonably clear. Upon completion of the work, he shall remove all temporary construction facilities, debris and unused materials provided for the work and put the whole site to the work and public rights-of-way in a neat and clean condition. No trash burning will be permitted on the site of the work. The Contractor shall obey all OWNER and existing State and local regulations.

5.26. INSPECTION

A. All materials and workmanship shall be subject to inspection, examination, or test by the OWNER and the Engineer at any and all times during manufacture or construction and at any and all places where such manufacture or construction is carried on. The OWNER shall have the right to reject defective material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of specified quality without charge therefor. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the OWNER may by Contract or otherwise have the defects remedied or rejected materials removed from the Project Area and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the OWNER.

B. The Contractor shall furnish promptly all materials reasonably necessary for any tests which may be required. (See Section 519 hereof.) All tests by the OWNER will be performed in such manner as not to delay the work unnecessarily and will be made in accordance with the provisions of the Technical Specifications.

C. The Contractor shall notify the OWNER sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the OWNER, the Contractor shall uncover for inspection and recover such facilities all at their own expense, when so requested by the OWNER. Should it be considered necessary or advisable by the OWNER at any time before final acceptance of the entire work to make an examination of work already completed by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect, due to fault of the Contractor or their Subcontractors, the Contractor shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus 15% of such costs to cover superintendence, general expenses and profit, shall be allowed the Contractor and he shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

D. Inspection of materials and appurtenances to be incorporated in the Improvements embraced in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the Technical Specifications, shall be final except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Site.

E. Neither inspection, testing, approval nor acceptance of the work in whole or in part, by the OWNER or its agents shall relieve the Contractor or their sureties of full responsibility for materials furnished, or work performed not in strict accordance with the Contract.

5.27. REVIEW BY OWNER

The OWNER, its authorized representatives and agents shall, at all times, have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however, that all instructions and approval with respect to the work will be given to the Contractor only by the OWNER through its authorized representatives or agents.

5.28. FINAL INSPECTION

When the Improvements embraced in this Contract are substantially completed, the Contractor shall notify the OWNER in writing that the work will be ready for final inspection on a definite date which shall be stated in the notice. The notice will be given at least ten (10) days prior to the date stated for final inspection and bear the signed concurrence of the representative of the OWNER having charge of inspection. If the OWNER determines that the status of the improvements is as represented, it will make the arrangements necessary to have final inspection commenced on the date stated in the notice, or as soon thereafter as is practicable. The inspection party will also include the representatives of each department of the Local Government.

5.29. CORRECTION OF WORK

All work, all materials, whether incorporated in the work or not, all processes of manufacture, and all methods of construction shall be at all times and places subject to the inspection of the Engineer who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture and methods of construction for the purposes for which they are used. Should they fail to meet their approval they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case may be, by the Contractor, at their own expense. Rejected material shall immediately be removed from the site. If, in the opinion of the Engineer and the OWNER, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as in the judgment of the OWNER shall be equitable. The Contractor shall be responsible for all costs associated with correction of work, including but not limited to police details, construction management/inspection, Traffic Engineering fees and materials testing.

5.30. INSURANCE

Contract Party shall procure Required Insurance as defined herein:

A. At the sole cost and expense of Contract Party.

B. Obtain and maintain such Required Insurance in full force and effect during the entire term of the Contract until all obligations of Contract Party have been discharged, including any warranty periods or extended reporting periods, against claims that may arise out of, are

alleged to arise out of, directly or indirectly, in whole or in part, from or in connection with the Contract and/or result from the performance of the Contract.

C. Any deductible, self-insured retention, or form of self-insurance under the policies shall be the sole responsibility of the Contract Party and shall be disclosed to and acceptable to the OWNER.

D. Any required liability insurance policy that is to insure any form of products liability and/or completed operations exposure created by Contract Party must provide extended coverage as follows:

1. When required liability insurance policy uses “Occurrence” coverage trigger (Including that known as “Reported Occurrence”):

   (a) Policy issued by same insurer for Contract Party as of effective date of Contract between State and Contract Party or by comparable insurer providing renewal insurance policy of 1-same coverage terms and conditions of prior expired policy or 2-coverage at least equal to that required by Contract.

2. Such coverage must be provided for a period of not less than five (5) years after the later of:

   (a) when the Contract has ended; or

   (b) when products or services have been put to intended use; or

   (c) when hardware, software, buildings, other physical structures or repairs have been put to intended use.

3. Such required insurance can be provided by annual insurance policies or by single runoff policy commonly referred to as “discontinued products or operations.”

E. When required liability insurance policy uses any form of “claims-first made trigger:”

1. Policy issued by same insurer for Contract Party as of effective date of Contract between State and Contract Party or by comparable insurer providing renewal insurance policy of 1-same coverage terms and conditions of prior expired policy or 2-coverage at least equal to that required by Contract and provide the OWNER with an additional endorsement for additional insured requirements.

2. Provide coverage with a retroactive date on or before the effective date of the Contract or at the beginning of Contract work.

3. Such coverage must be provided for a period of not less than five (5) years after the later of:

   (a) when the Contract has ended; or

   (b) when products or services have been put to intended use; or

   (c) when hardware, software, buildings, other physical structures or repairs have been put to intended use.

4. Such required insurance can be provided by annual insurance policies or by single runoff policy commonly referred to as “discontinued products or operations”.

5. If “claims-first made” liability insurance policy is cancelled or not renewed, and not replaced with another claims-made policy form with a retroactive date prior to the Contract date, the Contract Party must purchase extended reporting coverage for a minimum of five (5) years after completion of work.

6. Required Insurance limits to be provided by single insurance policy or through “follow form primary” layered excess insurance policies to obtain overall required limit(s).

7. Contract Party’s subcontractors to maintain same insurance.

8. Any insurance obtained by Contract Party that includes an “insured vs. insured” exclusion must be revised to exclude State and OWNER as Additional Insured.

9. The OWNER reserve the right to consider and accept alternative forms and plans of insurance or to require additional more extensive coverage for any individual requirement and can modify types of insurance and revise limits required of Contract Party at any time during the term of this Contract.

F. Required Insurance:

1. Commercial General Liability Insurance:

Commercial General Liability Insurance (“CGL”) based on Insurance Services Office (“ISO”) most recent version of Commercial General Liability policy form CG00 01, or its equivalent:

(a) Covering bodily injury (including death), broad form property damage, personal and advertising injury, independent contractors, products and completed operations and contractual liability.

(b) Such insurance coverage is subject to a minimum combined single limit of $1,000,000 per occurrence, $2,000,000 general aggregate and $1,000,000 products/completed operations aggregate.

(c) The general aggregate must be on a “per project” or “per location” basis.

(d) Shall include waiver of subrogation in favor of State and City of Providence.

(e) Include State and OWNER as additional insured on a primary and non-contributory basis.

(f) The Contract Party shall submit a copy of any policy endorsement, or blanket endorsement, evidencing the State and OWNER as additional insured on a primary and non- contributory basis and a waiver of subrogation in favor of State and OWNER. All endorsements shall be subject to review and approval by the authorized State personnel.

(g) Any time Contract Party is responsible for construction of any kind the additional status for State shall include additional Insured-products/completed operations in addition to additional insured-premises/operations.

2. Automobile Liability Insurance:

Automobile Liability Insurance based on ISO most recent version of Business Automobile Policy (“BAP”) CA 00 01, or its equivalent:

(a) Covering bodily injury and property damage for any vehicles used in conjunction with the performance of this Contract including owned, non-owned, and hired vehicles.

(b) If a Contract Party does not own any vehicle at any time during the duration of this Contract then the Contract Party can seek hired and non-owned automobile coverage as provided by BAP or by hired non-owned automobile coverage endorsement to CGL.

(c) At a minimum Contract Party must maintain hired and non-owned automobile coverage for the full duration of this Contract.

(d) Such insurance coverage is subject to a minimum combined single limit of $1,000,000 per occurrence and $2,000,000 aggregate.

(e) Shall include waiver of subrogation in favor of State and City of Providence.

3. Workers' Compensation and Employers' Liability:

(a) Statutory coverage as required by the workers' compensation laws of the State of Rhode Island, plus any applicable state law other than State of Rhode Island if employee(s) state of hire is other than State of Rhode Island or employee(s) work related to the Contract is not in the State of Rhode Island.

(b) Policy form based on NCCI or its equivalent.

(c) Employers' Liability with minimum limits of $500,000 each accident, $500,000 disease or policy limit and $500,000 each employee or minimum amount necessary for umbrella/excess liability policy of Contract Party.

(d) A Contract Party neither eligible for, nor entitled to, Worker's Compensation who is an independent Contract Party under Rhode Island law must comply with the statutory procedure precluding an independent Contract Party from bringing a workers' compensation claim against the State or the OWNER.

(e) Policy to include waiver of subrogation in favor of State and OWNER.

(f) The Contract Party shall submit a copy of any policy endorsement or blanket endorsement evidencing the waiver of subrogation in favor of the State and OWNER. All endorsements shall be subject to review and approval by the State authorized personnel.

4. Umbrella Liability Insurance

(a) $5,000,000 per occurrence and $5,000,000 in aggregate.

5. Pollution Liability Insurance

(a) $2,000,000 policy limit

G. All Required Insurance shall be placed with insurers:

1. Authorized to do business in Rhode Island.

2. Rated "A-," class X or better by A.M. Best Company, Inc.

3. Any insurer with a lesser financial rating must be approved by the authorized State personnel.

H. The legal defense provided to the State and the OWNER under the policy and any endorsements must be free of any conflicts of interest, even if retention of separate legal counsel for the State and the OWNER is necessary.

I. As evidence of the insurance required by this Contract, the Contract Party shall furnish to OWNER Certificates of Insurance, including confirmation of all required policy endorsements including, but not limited to, additional insured endorsements:

1. In form acceptable to the OWNER prior to project award. Failure to comply with this provision may result in rejection of the bid offer.

2. All certificates of insurance, whenever issued, shall include the requirement of the insurer for thirty (30) days advance written notice of cancellation or non-renewal of any insurance policy to the OWNER. Contract Party shall also immediately notify the OWNER if the Required Insurance is cancelled, non-renewed, potential exhaustion of policy limits or otherwise changed.

3. Certificates of Insurance and required endorsements shall thereafter be submitted annually or earlier upon expiration and renewal of any of the policies.

4. All Certificates of Insurance and to the extent possible endorsements shall reference the State procurement number.

5. OWNER retains the right to demand a certified copy of any Required Insurance policy, Certificate of Insurance or endorsement.

6. The Contract Party shall submit a copy of any policy endorsement, or blanket endorsement, evidencing the OWNER as additional insureds on a primary and non-contributory basis and a waiver of subrogation in favor of OWNER. All endorsements shall be subject to review and approval by the OWNER.

J. The Contract Party shall be responsible to obtain and maintain insurance on any real or personal property owned, leased or used by OWNER that is in the care, custody or control of Contract Party. All property insurance of Contract Party must include a waiver of subrogation that shall apply in favor of the OWNER.

K. No warranty is made that the coverages and limits listed herein are adequate to cover and protect the interests of the Contract Party for the Contract Party's operations. These are solely minimums that have been established to protect the interest of the OWNER.

L. OWNER shall be indemnified and held harmless as required by the Contract and to the full extent of any coverage actually secured by the Contract Party in excess of the minimum requirements set forth above.

M. The Contract Party shall use at its own risk and insure at its own cost any of its owned, leased or used real or personal property. All such insurance of Contract Party must include a waiver of subrogation that shall apply in favor of the OWNER.

N. The Contract Party shall comply with any other insurance requirements including, but not limited to, additional coverages or limits contained in the procurement or solicitation.

O. Failure to comply with these Insurance Requirements is a material breach entitling the OWNER to terminate or suspend the Contract immediately.

P. These Insurance Requirements shall survive expiration or termination of the Contract.

5.31. PATENTS

The Contractor shall hold and save the OWNER, its officers and employees, harmless from liability of any nature or kind, including costs and expenses, for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contact, including its use by the OWNER, unless otherwise specifically stipulated in the Technical Specifications.

5.32. WARRANTY OF TITLE

No material, supplies, or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvement and appurtenances constructed or placed thereon by him to the OWNER free from any claims, liens, or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the OWNER. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

5.33. GENERAL GUARANTEE

Neither the final certificate of payment nor any provision in the Contract nor partial or entire use of the Improvements embraced in this Contract by the OWNER or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of 24 months from the date of final acceptance of the work. Final acceptance shall be defined as the date in which all outstanding punch list items are completed and when all work items identified during the final inspection are completed The OWNER will give notice of defective materials and work with reasonable promptness.

5.34. REPRESENTATIONS OF CONTRACTOR

The Contractor represents and warrants:

A. That they are financially solvent and that they are experienced and competent to perform the type of work or furnish the plant, material, supplies, or equipment to be performed or furnished by them; and

B. That they are familiar with all Federal, State, municipal and department laws, ordinances, orders and regulations which may in any way effect the work of those employed therein, including but not limited to any special, acts relating to the work or to the project of which it is a part; and

C. That such temporary and permanent work required by the Contract Documents to be done by them can be satisfactorily constructed and used for the purpose for which it is intended, and that such construction will not injure any person or damage any property; and

D. That they have carefully examined the Drawings, Technical Specifications and addendum (or addenda), if any, and the site of the work, and that from their own investigation they have satisfied themselves as to the nature and location of the work, the character, quality and quantity of surface and subsurface materials likely to be encountered, the character of equipment and. other facilities needed for the performance of the work, the general and local conditions, and all other materials which may in any way affect the work or its performance.

5.35. WEATHER CONDITIONS

In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor shall, and shall cause their Subcontractors to protect carefully their work and materials against damage or injury from the weather at no additional cost to the OWNER. If, in the opinion of the Engineer, any work or material shall have been damaged or injured by reason of failure on the part of the Contractor or any of their Subcontractors so to protect their work, or otherwise damaged by the negligence of the Contractor, Subcontractors or their agents or servants, or is otherwise defective, such materials shall be removed and replaced at the expense of the Contractor. Special attention shall be given to the winter shutdown period. All temporary patching to make the roads passable or to keep driveways open and safe, shall be done at no additional cost to the OWNER.

5.36. QUANTITIES OF ESTIMATE

Wherever the estimated quantities of work to be done and materials to be furnished under this contract are shown in any of the Contract Documents including the Bid (proposal), they are given for use in comparing bids and the right is especially reserved by the OWNER to increase or diminish them as may be deemed reasonably necessary or desirable by the OWNER, and such increase or diminution shall in no way vitiate claims or liability for damages except as provided for in Section 109 hereof.

5.37. NOTICE AND SERVICE THEREOF

A. The service of any notice, letter or other communication shall be deemed to have been made to one of the contracting parties on the other party to the Contract when such letter, notice or other communication has been delivered to the legal office address of the addressee, by a duly authorized representative of the address or in person, or when such notice, letter or other communication has been deposited in any regularly maintained mailbox of the United States Postal Department in a properly addressed, postpaid wrapper. The date of such service shall be considered to be the date of such personal delivery or mailing.

B. The address of the Contractor noted in their bid (proposal) and/or the address of their field office on or near the site of the work hereunder shall be considered as their legal address for the purposes as above set forth.

5.38. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

5.39. RELEASES

A. Neither the final payment nor any part of the retained percentage shall become due until the Contractor delivers to the OWNER a complete release of all liens, damages, and/or release of liens arising out of this contract, or receipts in full in lieu thereof, and an affidavit that so far as

he has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed, but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the OWNER to indemnify him against any liens. If any liens remain unsatisfied after all payments are made, the Contractor shall refund to the OWNER all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

B. THE OWNER, PRIOR TO MAKING EACH PAYMENT TO THE CONTRACTOR, may require the Contractor to furnish releases or receipts from any or all persons / firms performing work and supplying material or services to the Contractor, or any Subcontractor, if deemed necessary to protect its interest.

5.40. CONTRACTOR'S OBLIGATIONS

A. The Contractor shall and will in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this Contract, within the time herein specified, in accordance with the provisions of this Contract and said Technical Specifications and in accordance with the Plans and Drawings covered by this contract and any and all supplemental Plans and Drawings, and in accordance with the directions of the Engineer as given from time to time during the progress of the work as may be required. He alone shall be responsible for the safety, efficiency and adequacy of their plant, appliances and methods and for any damage which may result from their failure or their improper construction, maintenance or operation. The Contractor shall observe, comply with and be subject to all terms, conditions, requirements and limitations of the Contract specifications, and shall do, carry on, and complete the entire work to the satisfaction of the Engineer and the OWNER.

B. The Contractor shall be solely responsible for all the work and shall provide all precautionary measures necessary for preventing injury to persons or damage to property. All injury or damage of whatever nature resulting from the work or resulting to persons, property or the work during its progress, from whatever cause, shall be the responsibility of and shall be borne and sustained by the Contractor. The Contractor shall hold the Engineer, the OWNER or their agents harmless and defend and indemnify the Engineer and the OWNER or their agents against damages or claims for damages due to injuries to persons or to property arising out of the execution of the work and for damages to materials furnished for the work, infringement of inventions, patents and patent rights used in doing the work, or damages arising out of the use of any improper materials, equipment, or labor used in the work, and for any act, omission or neglect of the Contractor, their agents, employees and their Subcontractors therein. He shall bear all losses resulting to him including but not limited to losses sustained on account of character, quality or quantity of any part or all of the work, or because the nature of the land in or on which the work done being different from what was estimated or indicated, or on account of the weather, elements or other causes.

5.41. ENGINEER'S AUTHORITY

A. The Engineer shall give all orders and directions contemplated under this Contract and Technical Specifications relative to the execution of the work. The Engineer shall determine the amount, quality, acceptability and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to said work and construction thereof. The Engineer's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties hereto relative to said Contract or Technical Specifications, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected in any manner or to any extent by such question. The Engineer shall decide the meaning and intent

of any portion of the Technical Specifications and of any Plans or Drawings where the same may be found obscure or be in dispute. Any differences or conflicts in regard to their work which may arise between the Contractor under this Contract and other Contractors performing work for the OWNER shall be adjusted and determined by the Engineer.

B. The Engineer does not have unilateral authority and shall work collaboratively with the OWNER.

5.42. ALL WORK SUBJECT TO CONTROL BY ENGINEER

A. In the performance of the work, the Contractor shall abide by all orders, directions and requirements of the Engineer or their designee, and shall perform all work to the satisfaction of the Engineer, and at such time and places, by such methods and in such manner and sequence as he may require. The Engineer shall determine the amount, quality, acceptability and fitness of all parts of the work. The Engineer shall interpret the Drawings, Technical Specifications, Contract, all other documents and the extra work orders. The Engineer shall also decide all other questions in connection with the work. The Contractor shall employ no plant, equipment, materials, methods or men to which the Engineer objects and shall remove no plant, materials, equipment or other facilities from the site of the work without the Engineer's permission. Upon request, the Engineer will confirm in writing any oral order, direction, requirement or determination.

B. Inspectors shall be authorized to inspect all work done and material furnished. Such inspection may extend to all or any part of the work, and to the preparation or manufacture of the materials to be used. The presence or absence of an Inspector shall not relieve the Contractor from any requirements of the Contract. In case of any dispute arising between the Contractor and the Inspector as to materials furnished or the manner of performing the work, the Inspector shall have the authority to reject material or suspend the work until the question at issue can be referred to and decided by the Engineer. The Inspector shall not be authorized to revoke, alter, enlarge, relax or release any requirement of these specifications, nor to approve or accept any portion of the work, nor to issue instructions contrary to the drawings and specifications. The Inspector shall in no case act as foreman or perform other duties for the Contractor, or interfere with the management of the work by the latter. Any advice which the Inspector may give the Contractor shall in nowise be construed as binding the OWNER or the Engineer in any way nor releasing the Contractor from the fulfillment of the terms of the contract.

5.43. INTERPRETATION OF DRAWINGS AND TECHNICAL SPECIFICATIONS

A. Except the Contractor's executed set, all Drawings and Technical Specifications are the property of the OWNER. The OWNER will furnish the Contractor electronic files of Drawings and Technical Specifications. The Contractor is responsible to print the documents to supply to construction personnel.

B. The Contractor shall keep at the site of the work one copy of the Drawings and Technical Specifications, and shall at all times give the OWNER and the Engineer and their representatives access thereto. Anything shown on the Drawings and not mentioned in the Technical Specifications, or mentioned in the Technical Specifications and not shown on the Drawings, shall have the same effect as if shown or mentioned in both. In case of any conflict or inconsistency between the Drawings and Technical Specifications, the Specifications shall take precedence. Any discrepancy in the Technical Specifications and the Drawings shall be immediately submitted by the Contractor to the OWNER and Engineer for decision and the decision thereon by the OWNER and Engineer shall be final. In case of differences between small and large scale drawings, the larger scale drawings shall take precedence.

5.44. ENGINEER'S CONTROL NOT LIMITED

The enumeration in this Contract of particular instances in which the opinion, judgment, discretion or determination of the Engineer shall control or in which work shall be performed to their satisfaction or subject to their approval or inspection, shall not imply that only matters similar to those enumerated shall be so governed and performed, but without exception all the work shall be so governed and performed.

5.45. CONTRACT AND CONTRACT DOCUMENTS

The Drawings, the Technical Specifications and Addendum (or Addenda), the Advertisement, the Information for and Notice To Bidders, and the Bid (Proposal) as accepted by the OWNER as evidenced by the OWNER's Notice to Award to the Contractor, which Notice is made a part of this Contract. Special Provisions and the General Provisions shall form a part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal references to various provisions of the Contract Documents are in no way to affect, limit or cast light on the interpretation of the provisions to which they refer. Whenever the term "Contract Documents" is used, it shall mean and include this Contract, the enumerated Drawings, Special Provisions, General Provisions, the Technical Specifications, the Advertisement, the enumerated Addendum (or Addenda), Information for Bidders, the Bid (Proposal) as accepted by the OWNER. The OWNER shall interpret their own requirements. In case of any conflict or inconsistency between the provisions or this signed portion of the Contract and those of the Technical Specifications, the provisions of this signed portion of the Contract shall govern.

5.46. LIST OF DRAWINGS:

The list of Drawings for the project can be found in the SPECIAL CONDITIONS, Section 6.70.

5.47. COORDINATION WITH UTILITIES

A. The Contractor shall arrange and cooperate with the various utility corporations or other parties interested in connection with the relocation and maintenance of all public fixtures when necessary and appurtenances or service connections within or adjacent to the limits of construction, as directed by the Engineer. There shall be no additional payment for such coordination. The Contractor shall be aware of such projects and prepare the schedule accordingly.

B. The Contractor will be responsible for any damage done to any utility poles or lines, curbing, basins, hydrants, water and sewer lines, conduits and other accessories and appurtenances of a similar nature which are fixed or controlled by the City Public Utility Company or Corporation. They shall perform and carry out their work in such a manner as not to interfere with or damage fixtures mentioned herein, or as shown on the Plans or discovered during construction.

C. The Contractor shall notify the affected Utility companies at least fourteen (14) calendar days prior to commencing work in the location of the respective utility.

D. The purpose of this advanced notification is to allow the utility company ample time to adjust, reconstruct or reset utility features within the influence of the Work of the roadways and sidewalks scheduled for construction.

5.48. MAINTENANCE OF FIRE LANES

Fire lanes designated by the Department of Public Safety must be accessible at all times for firefighting equipment, other emergency apparatus and traffic crossing.

5.49. "OR APPROVED EQUAL" CLAUSE

Whenever a material or article required is specified or shown on the Drawings by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory providing the material or article so proposed is of equal substance and function in the Engineer's and City's opinion. It shall not be purchased or installed without the OWNER's written approval. In all cases new material shall be used on the project.

5.50. REPORTS, RECORDS AND DATA

The Contractor and each of their Subcontractors shall submit to the OWNER such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Engineer may request concerning work performed or to be performed under this Contract.

5.51. SAFETY AND HEALTH REGULATIONS

These construction documents, and the joint and several phases of construction hereby contemplated, are to be governed, at all times, by applicable provisions of the Federal law(s), including, but not limited to, the latest amendments of the following:

A. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 91-596;

B. Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

C. Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

5.52. PROTECTION OF LIVES AND PROPERTY

A. In order to protect the lives and health of their employees under the Contract, the Contractor shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Incorporated, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under this Contract.

B. The Contractor alone shall be responsible for the safety, efficiency and adequacy of their plant, appliances and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

C. The Contractor shall be solely responsible for the acts and omissions of their agents, employees and their Subcontractors and their agents and employees and shall hold the Engineers and the OWNER harmless and defend the injuries to others or property of others which result from said acts or omissions.

5.53. CONTRACTOR TO LAY OUT THEIR OWN WORK

The Contractor shall be responsible to lay out all the contract work and shall be responsible for the accuracy of all lines, grades and measurements, and conformance to the Americans with Disabilities Act.

5.54. SUBSURFACE DATA

A. The Contractor shall be aware that some buildings in the City have basements and/or utility vaults under the sidewalks. The Contractor shall be solely responsible to verify the presence of building/utility vaults and use extreme care when working within or adjacent to sidewalks in front of buildings that may contain vaults. Any basement or utility vaults damaged by the Contractor while carrying out this Contract shall be repaired by the Contractor to the satisfaction of the Engineer at no additional charge to the OWNER. The Contractor is solely responsible for the investigation of subsurface basement vaults. It is recommended that the Contractor perform a pre-existing conditions survey.

B. Pavement cores have not been obtained by the Design Engineer. Core logs are not included in the Contract Documents.

5.55. NON-FEDERAL LABOR STANDARD PROVISIONS

The following Non-Federal Labor Standards Provisions, including the following provisions concerning maximum hours of work, minimum rates of pay, and overtime compensation, with respect to the categories and classifications of employees hereinafter mentioned are included in this Contract pursuant to the requirements of applicable State or local laws, but the inclusion of such provisions shall not be construed to relieve the Contractor or any Subcontractor from the pertinent requirements of any corresponding Federal Labor-Standards Provisions of this contract. In case the set forth in the Federal Labor Standards Provisions of this Contract for corresponding classifications, be the applicable minimum rates of pay for such classifications. The limitations, if any, in these employees engage on the work covered by this Contract may be required of permitted to work thereon shall not be exceeded.

A. Other Stipulations

1. The Contractor shall comply with the applicable provisions of all Rhode Island labor laws as administered by the Rhode Island State Department of Labor, including particularly the provisions of the following:

   (a) Title 37, Chapter 13, Sections 1 to 14

   (b) Title 28, Chapter 16, Sections 1 and 2

   (c) Title 45, Chapter 32, Sections 43 and 44

B. The Contractor shall further comply with the applicable provisions of the Rhode Island Employment Security Act and the Rhode Island Temporary Disability Insurance Act, and shall report, upon the certified copies of payrolls as required by the GENERAL CONDITIONS, all employer contributions made and all employee deductions taken in compliance with said Acts.

C. The Contractor shall further comply with the applicable provisions of Title 28, Chapter 5, Sections 1 to 43, of the General Laws of Rhode Island, 1956 the State Fair Employment Practices Act, as amended.

D. Schedule of Salaries and Wages

The rates of payment of wages, obligations and charges for labor by the contractor shall be not less than Davis-Wage determinations available online at https://beta.sam.gov/.

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6. SPECIAL CONDITIONS

6.1. PROJECT AREA

The Project Area shall be considered the City of Providence boundaries

6.2. TIME FOR COMPLETION

The work which the Contractor is required to perform under this Contract shall be commenced at the time stipulated by the OWNER in the Notice to Proceed to the Contractor and shall be fully completed, including all punch list items by the date specified in the OWNER's Notice-to-Proceed letter. Time is of the essence and the construction needs to occur in a continuous manner without gaps in the work, unless an excusable delay occurs, as defined in GENERAL PROVISIONS PART I, Section 111.

6.3. LIQUIDATED DAMAGES

A. Liquidated damages shall be as set forth below.

B. The Contractor shall pay special attention to the timelines and liquidated damages associated with the substantial completion of the work. In the event the OWNER determines that the project is not substantially complete by the date specified in the OWNER's Notice-to-Proceed letter, as required herein, a daily charge will be deducted from monies due the Contractor.

C. The charge for this Contract will be $5,000.00 per day for each calendar day that the work is not in compliance.

6.4. RESPONSIBILITIES OF CONTRACTOR

Except as otherwise specifically stated in the Contract Documents and Technical Specifications, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, heat, power, transportation, superintendence, temporary construction of every nature, charges, levies, fee or other expenses and all other services and facilities of every nature whatsoever necessary for the performance of the Contract and to deliver all improvements embraced in the Contract for Site Preparation complete in every respect within the specified time.

6.5. COMMUNICATIONS

A. All notices, demands, requests, instructions, approvals, proposals, and claims must be in writing.

B. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Agreement (or at such other office as the Contractor may from time to time designate in writing to the OWNER), or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

C. All papers required to be delivered to the OWNER shall, unless otherwise specified in writing to the Contractor, be delivered to the Department of Public Works, 700 Allens Avenue, Providence, Rhode Island 02905, and any notice to or demand upon the OWNER shall be sufficiently given if so delivered, or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission to said OWNER at such address, or to such other representatives of the OWNER or to such other address as the OWNER may subsequently specify in writing to the Contractor for such purpose.

D. Any such notice shall be deemed to have been given as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post, or in the case of telegrams, at the time of actual receipt, as the case may be.

6.6. PARTIAL USE OF SITE IMPROVEMENTS

The OWNER, at its election, may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the Technical Specifications and if in its opinion, each such section is reasonably safe, fit and convenient for the use and accommodation for which it was intended, provided:

A. The use of such sections of the improvements shall in no way impede the completion of the remainder of the work by the Contractor.

B. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.

C. The use of such sections shall in no way relieve the Contractor of their liability due to having used defective materials or to poor workmanship.

D. The period of guarantee stipulated under GENERAL CONDITIONS, Section 5.33, shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

6.7. WORK BY OTHERS

The Contractor will consult and cooperate with the utility companies to permit their work to proceed coincidentally with the work under this contract so as not to delay completion of the project.

6.8. CONTRACT DOCUMENTS AND DRAWINGS

Contract documents will be available for download from https://www.providenceri.gov/purchasing/. There will be no charge or fee for obtaining each set of bidding documents.

6.9. DISPOSAL OF SALVAGED MATERIALS

A. All salvaged material such as granite curbing; manhole frames and covers; catch basin frames, grates, covers and traps; etc., not required to be installed in the work shall be removed and transported to the City of Providence, Department of Public Works storage yards located in the vicinity of 700 Allens Avenue, Providence, Rhode Island 02905.

B. The above work shall be accomplished at no additional expense to the OWNER but the cost of the work shall be included in the submitted unit price for the applicable items of work.

C. The Contractor shall be responsible for arranging salvaged materials delivery and obtaining signed receipt(s) from responsible personnel at the above agencies listing material types and quantities salvaged and delivered. Copies of receipt(s) shall be provided said agencies and the Local Public Agency on the date of delivery.

6.10. PROVISION FOR FLOW OF PRESENT DRAINAGE

Provision for the flow of all sewers, drains and watercourses that are met or altered during construction shall be provided by the Contractor and all the connections shall be restored without extra charge. All offensive matter shall be removed immediately with such precautions as may be directed. If required, the Contractor shall install temporary bypass connections for surface or pipe drainage facilities to provide uninterrupted or continuous service during the work of construction. Contractor is responsible to clean sediment and erosion control devices, as well as clearing

standing water as a result of the presence of sediment and erosion controls immediately upon request, and at no additional charge.

6.11. WORK TO BE ACCOMPLISHED IN ACCORDANCE WITH THE DRAWINGS AND TECHNICAL SPECIFICATIONS

The work, during its progress and at its completion, shall conform to the lines and grades shown on the Drawings and to the directions given by the Engineer from time to time, subject to such modifications or additions as they shall determine to be necessary during the execution of the work; and in no case, will any work be paid for in excess of such requirements. The work shall also be accomplished in accordance with the date provided in Section 6.2 (Time for Completion), hereof.

6.12. CONTRACTOR TO CHECK DIMENSIONS AND SCHEDULES

The Contractor will be required to check all dimensions and quantities shown on the Drawings or schedules given to him by the Engineer and shall notify the Engineer of all errors therein which he may discover by examining and checking them. The Contractor shall not take advantage of any error or omissions in these Technical Specifications, Drawings or schedules. The Engineer will furnish all instructions should such errors or omissions be discovered, and the Contractor shall carry out such instructions as if originally specified.

6.13. PROTECTION OF TREES

The Contractor shall take special care to preserve and protect from injury all trees and other plant material to remain along the lines of construction. No such trees or plant material shall be removed or cut down, trimmed or otherwise cut without permission from the Engineer. Failure to comply may result in a fine by the City Forester.

6.14. REMOVAL OF WATER AND PROTECTION FROM FLOODING

The Contractor shall construct and maintain, at no additional expense to the OWNER, all pumps, drains, well points or any other facility for the control and collection of groundwater and/or surface water and provide all pumps and piping for the removal of water from the trenches and excavations so that all trenches and excavations may be kept, at all times, free from water and so that all construction work may be performed in the dry. Any damage resulting from the failure of the dewatering operations of the Contractor and any damage resulting from the failure of the Contractor to maintain the areas of all work in a suitable dry condition, shall be repaired by the Contractor as directed by the Engineer, at no additional expense to the OWNER. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to existing structures and utilities and the contract work, and so that no loss of ground will result from these operations. Precautions shall be taken to protect new and existing work from flooding during storms or from other causes. Pumping shall be continuous where directed by the Engineer, to protect the work and/or maintain satisfactory progress. All pipe lines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations and drainage operations shall be disposed of in such a manner as will neither cause public nuisance, nor cause injury to public health nor to public or private property nor to the work completed, nor to the work in progress. No extra payment will be made for the removal of water, protection from flooding, drainage work, diversion of existing water courses and such other work; but compensation therefor shall be considered as having been included in the prices stipulated for the appropriate items of work as listed in the Bid.

6.15. HURRICANE PROTECTION

Should hurricane warnings be issued, the Contractor shall take every practicable precaution to minimize danger to persons, to the work and to adjacent property. These precautions shall include closing all openings, removing all loose materials, tools and/or equipment from exposed locations, and removing or securing scaffolding and other temporary work.

6.16. FIRST AID TO INJURED

The Contractor shall keep in their office, ready for immediate use, all articles necessary for giving first aid to injured employees. He shall also provide arrangements for the immediate removal and hospital treatment of any employee injured on the work who may require the same.

6.17. CONFORMANCE WITH DIRECTIONS

The Engineer may make alterations in the line, grade, plan, form, dimensions or materials of the work, or any part thereof, either before or after the commencement of construction. If such alterations diminish the quantity included in any item of work to be done and paid for at a Unit Price, the Contractor shall have no claim for damages or for anticipated profits and the work that may thus be dispensed with. If they increase the quantity included in any such item, such increase shall be paid for at the stipulated price, but no such alteration shall increase shall be paid for at the stipulated price, but no such alteration shall be made without the consent of the OWNER.

6.18. PROTECTION AGAINST HIGH WATER AND STORM

A. The Contractor shall take all precautions to prevent damage to the work or equipment by high waters or by storms. The Engineer may prohibit the carrying out of any work at any time when, in their judgment, high waters or storm conditions are unfavorable or not suitable, or at any time, regardless of the weather, when proper precautions are not being taken to safeguard previously constructed work or work in progress.

B. In case of damage caused by the failure of the Contractor to take adequate precautions, the Contractor shall repair or replace equipment damaged and shall make such repairs or rebuild such parts of the damaged work, as the Engineer may require, at no additional expense to the OWNER.

6.19. SEQUENCE OF WORK

A. The Contractor shall be required to prosecute their work in accordance with a schedule prepared by him in advance in accordance with additional requirements specified herein and approved by the Engineer. This schedule shall state the methods and shall forecast the times for doing each portion of the work. Before beginning any portion of the work, the Contractor shall give the Engineer advance notice and ample time for making the necessary preparations.

B. Sequence and scheduling of the Work shall be submitted to the Contractor by City. The City reserves the right to indicate the sequence of work prior to construction.

C. In areas where both Roadway and Sidewalk work are to be constructed, the curbing and sidewalk work is to be constructed prior to final paving of adjacent roadways.

D. In areas where the Roadway is to be cold planed or patched, the Roadway is to be resurfaced within seven (7) calendar days after the original pavement surface is removed.

E. In areas where the Sidewalk is to be reconstructed or constructed, the sidewalk is to be in place within seven (7) calendar days after the original sidewalk surface is removed or excavation for the new sidewalk has taken place. Work in sidewalk areas shall be performed on one side of the road at a time, detouring pedestrians to the other side of the street to provide an accessible route for pedestrians. The Contractor shall work on whole blocks at a time to keep the construction zone contained and compressed. The length of the construction zone shall be approved the Engineer before work is started.

F. Work to install waterborne temporary striping shall occur immediately after paving. Work to install epoxy resin pavement striping shall occur fourteen (14) days after paving. If markings

do not begin at this time, this could be cause for suspending resurfacing operations until pavement striping and loop operation is put into effect.

G. Traffic detector loops shall be installed within 72 hours of disturbance or final paving.

6.20. COMPETENT HELP TO BE EMPLOYED

The Contractor shall employ experienced foremen, craftsmen and other workmen competent in the work in, which they are to be engaged, and whenever the Engineer shall notify the Contractor in writing that any person employed on the project is, in their opinion, incompetent, unfaithful, disorderly, or otherwise unsatisfactory, or not employed in accordance with 'the provisions of this contract, such person shall be discharged from the project and shall not be again employed on it.

6.21. STREETS AND SIDEWALKS TO BE KEPT OPEN

A. The Contractor shall at all times keep the streets, highways, roads, private walks and sidewalks in which he may be at work, open for pedestrian and vehicular traffic at their own expense, unless otherwise authorized by the Engineer in writing. If, in the opinion of the Engineer, the interest of abutters and public requires it, the Contractor shall bridge or construct plank crossings over the trenches at street crossings, roads, or private ways, or provide such temporary means of crossing and guarding as shall be acceptable to the Engineer. The Contractor shall conduct their work for this objective in such manner as the Engineer may direct from time to time. No sidewalk shall be obstructed where it is possible to avoid it. The closing of any traffic lanes shall be done only with the approval of the Providence Traffic Engineering Department.

B. The Contractor shall provide at their own expense, all necessary fire crossings at principal intersections or ways usually traveled by fire apparatus.

6.22. LIGHTS, BARRIERS, WATCHMEN AND INDEMNITY

A. The Contractor shall put up and maintain such barriers, lighting and warning lights, danger warning signals and signs that will prevent accidents during the construction work and protect the work and insure the safety of personnel and the public at all times and places, and the Contractor shall indemnify and protect the OWNER and the Engineer in every respect from any injury or damage whatsoever caused by any act or neglect of the Contractor or their subcontractors, or their servants or agents.

B. In addition to the above, when and as needed, or when required by the Engineer, the Contractor shall post signs and employ watchmen for excluding at all times unauthorized persons from the work, for which the Contractor will not be paid additional compensation.

C. The Contractor shall be responsible for excluding at all times from lands within easement areas, all persons not directly connected with the work or authorized by the OWNER to be in the work areas.

6.23. TRAFFIC CONTROL

A. Approval of any street closure, lane closure, sidewalk closure or detour must be coordinated with City of Providence Traffic Engineer before it is put into operation. All proper Traffic Engineering permits must be approved prior to work starting.

B. The Contractor shall make himself aware of all City regulations governing construction and their effect on vehicular and pedestrian traffic.

C. Whenever necessary, or whenever directed by the Engineer, the Contractor shall employ traffic control devices to insure a safe, orderly routing of traffic around or across the work. No separate payment shall be made for this work, but compensation, therefore, shall be

considered as having been included in the prices stipulated for the appropriate items of work as listed in the bid.

D. Where deemed necessary by the Engineer, supplementary traffic control shall be provided by off-duty, City of Providence Police Officers.

E. The Contractor shall request for use of off-duty, City of Providence Police Officers for supplementary traffic control in accordance with the "Not to Exceed Lump Sum" cost proposal submitted for each project. Invoices shall be billed directly to the OWNER.

F. The Contractor shall be solely responsible for the safe passage of traffic and shall indemnify and protect the OWNER and the Engineer in every respect from any injury or damage whatsoever caused by any act or neglect of the Contractor of their Subcontractors, or their servants or agents.

6.24. NIGHT WORK

A. Night work, or work on Saturdays, Sundays and legal holidays may be required in order to perform certain construction operations without causing excessive interference with or disruption of traffic flow, water service, etc.

B. Night work or work on Saturdays, Sundays and legal holidays shall be done only with the approval of the Providence Traffic Engineering Department.

C. All water work operations requiring the closing or shutdown of existing water service facilities will be conducted at those times as directed by the Engineer that will minimize the interference with, or disruption of service.

D. All trenching, pipe laying, paving operations, etc., shall be conducted at times as directed by the Engineer that will minimize the interference with normal and emergency vehicular traffic flow.

E. No work shall be scheduled by the Contractor on nights, Saturdays, Sundays or legal holidays unless directed or approved in writing by the OWNER. The Contractor will receive no extra payment for work at these times and compensation shall be considered as having been included in the prices stipulated for the appropriate items of work as listed in the Proposal.

F. All necessary lighting, safety precautions, and other requirements for night, Saturday, Sunday and holiday work shall be provided at no extra cost to the OWNER.

G. The assumption is made that all work outside of milling, paving and pavement marking activity will be able to occur during daylight hours.

6.25. BUS LINE INTERFERENCE

Whenever it may be necessary to interfere with any bus lines, notice shall be given to the Rhode Island Public Transit Authority (RIPTA) owning the same, and reasonable time shall be given to said corporation to arrange the schedule for operation of same, as may be necessary. RIPTA shall be notified for any work impacting their bus routes or adjacent (within 200 to their shelters from the approach side and 100 feet to the exit side).

6.26. WORK IN COLD WEATHER

A. The Engineer will determine when conditions are unfavorable for work and may order the work or any portion of it suspended whenever, in their opinion, the conditions are not such as will insure first class work. In general, work shall be prosecuted throughout the year and the Contractor will be expected to keep work going and employment of labor as continuous as possible.

B. All methods and materials used for concrete or masonry work in cold weather shall be subject to the approval of the Engineer. The Contractor shall take the necessary precautions to protect the work from damage and for removing ice and frost from materials, including heating the water, sand and coarse aggregate and for protecting the newly laid masonry. This protection shall also include the covering of work with tarpaulins and the heating by salamanders or steam pipes or other suitable method. The Contractor will receive no extra payment or any labor, apparatus, tools or materials necessary to comply with the above requirements, but compensation shall be considered to be included in the prices stipulated for the appropriate items of work as listed in the bid.

C. In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor will, and will cause their Subcontractors to protect carefully their work and materials against damage or injury from the weather. If in the opinion of the Engineer, any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of their Subcontractors to so protect their work, such materials shall be removed and replaced at the expense of the Contractor.

D. In the event that the project is shut down during the winter months, the Contractor will be required to install, maintain and remove such temporary materials as may be required to protect completed work and to provide safe vehicular and pedestrian access. No separate payment shall be made to the Contractor for such temporary materials and labor.

6.27. BLASTING AND EXPLOSIVES

A. Blasting or use of explosives will not be permitted on this project.

B. Rock, boulders, ledge, concrete foundations, etc., shall be removed by the use of pneumatic tools; drilling and splitting mechanically or by hand; or by other means not requiring the use of explosives.

6.28. RESERVED MATERIALS

A. Materials found on the work suitable for any special use shall be reserved for that purpose without charge to the OWNER.

B. Where permitted, the Contractor may use in the various parts of the work, without charge to the OWNER, therefore, any materials taken from the excavations.

6.29. DISPOSAL OF MATERIALS. ACCESS TO HYDRANTS AND GATES AND MATERIALS TRIMMED- UP FOR CONVENIENCE OF PUBLIC TRAVEL OR ADJOINING TENANTS

A. The materials from the trench and excavations and those used in the construction of the work shall be deposited in such a manner so they will not endanger persons or the work, and so that free access may be had at any time to all hydrants and gates in the vicinity of the work. The materials shall be kept trimmed-up so as to be of as little inconvenience as possible to the public travel or the adjoining tenants. All excavated materials not approved for backfill and fill, all surplus material and all rock resulting from the excavations shall be removed and satisfactorily disposed of off the site by the Contractor at no additional expense to the OWNER.

B. The disposal of any excess or unsuitable material including earth, pavement, debris from demolished structures of all types, vegetative matter and any other material either found on the work site or brought to the site by the contractor or subcontractors will be in accordance with all applicable local, State and Federal laws. The following procedures will be encountered during the prosecution of work:

1. Under no circumstances will any material be deposited in a freshwater or coastal wetland or regulated areas. The Contractor must obtain the permission of the Engineer prior to

on site disposal of material.

2. The off-site disposal of any material will be allowed only by written permission of the property OWNER upon whose property the material is to be deposited. The Contractor must furnish a copy of said written permission.

3. For all off-site disposal areas, it will be the Contractor's responsibility to obtain the approval of the Department of Environmental Management, the Coastal Resources Management council, and any other governmental agency as necessary.

C. The above procedures will be performed by the Contractor at no additional cost to the Agency or City. Under these procedures, the Contractor retains all responsibilities and liabilities under City, State and Federal laws for violations resulting from disposal of material from the project and will defend and hold the Agency and City harmless there from.

D. Removal and disposal of the Asbestos Cement materials shall be according to all current City, State and Federal regulations.

6.30. LENGTH OF TRENCH TO BE OPENED, MAINTAINING PREMISES FROM OBSTRUCTIONS, CROSSOVERS, DIRECTIONAL SIGNS, AND LIGHTS

A. The length of trench opened at any time from point where ground is being broken to completed backfill and also the amount of space in streets or public and private lands occupied by equipment, trench and supplies, shall not exceed the length or space considered reasonably necessary and expedient by the Engineer. In determining the length of open trench or spaces for equipment, materials, supplies and other necessities, the Engineer will consider the nature of the construction and equipment being used, inconvenience to the public or to private parties, possible dangers and other proper matters. All work must be constructed with a minimum of inconvenience and danger to the public and all other parties concerned.

B. Whenever any trench obstructs pedestrian and vehicular traffic in or to any, public street, private driveway or property entrance, or on private property, the Contractor shall take such means as may be necessary to maintain pedestrian and vehicular traffic and access. Until such time as the work may have attained sufficient strength to support backfill, or if for any other reason it is not expedient to backfill the trench immediately the Contractor shall construct and maintain suitable plank crossings and bridges to carry essential traffic in or to the street, driveway or property in question as specified or directed.

C. Suitable signs, lights and such required items to direct traffic shall be furnished and maintained by the Contractor.

D. The Contractor must keep streets and premises free from unnecessary obstructions, debris and all other materials. The Engineer may, at any time, order all equipment, materials, surplus from excavations, debris and all other materials lying outside that length of working space promptly removed and should the Contractor fail to remove such material within 24 hours after notice to remove the same, the Engineer may cause any part or all of such materials to be removed by such persons as he may employ, at the Contractor under the contract. In special cases, where public safety urgently demands it, the Engineer may cause such materials to be removed without prior notice.

6.31. INTERFERENCE WITH EXISTING STRUCTURES

A. Whenever it may be necessary to cross or interfere with existing culverts, drains, sewers, water pipes or fixtures, guardrails, fences, gas pipes or fixtures, or other structures needing special care, due notice shall be given to the Engineer and to the various public and private agencies or individuals responsible for the utility or structure that is interfered with. Whenever required, all objects shall be strengthened to meet any additional stress that the work herein specified may impose upon it, and any damage caused shall be thoroughly repaired. The entire work shall be the responsibility of the Contractor and the work shall be performed at no

additional expense to the OWNER.

B. The Contractor shall be responsible for all broken mains or utilities encountered during the progress of the work and shall repair and be responsible for correcting all damages to existing utilities and structures at no additional expense to the OWNER. The Contractor shall contact the proper utility or authority to correct or make any changes due to utility or other obstructions encountered during the work, but the entire responsibility and expense shall be with the Contractor.

C. All damaged items of work or items required to be removed and replaced due to construction shall be replaced or repaired by the Contractor to the complete satisfaction of the property OWNERs and/or the Engineer at no additional expense to the OWNER.

6.32. MATERIALS

All materials furnished and used in the completed work shall be new, of best quality workmanship and design and recognized as standard in good construction practices. Whenever a specification number or reference is given, the subsequent amendments (if any) shall be included. The standards set forth in the selection of materials and supplies are intended to conform with those standards adopted by the OWNER. Preference in manufacture shall be given to adopted standards and the Contractor shall further familiarize himself with the requirements of the OWNER when the occasion or choice of materials or supplies so demands.

6.33. DEFECTIVE MATERIALS, INSPECTION AND TESTING OF MATERIALS FURNISHED, SAMPLES AND ORDERING LISTS

A. No materials shall be laid or used which are known, or may be found to be in any way defective. Any materials found to be defective at the site of the work or upon installation shall be replaced by the Contractor at their expense. Notice shall be given to the Engineer of any defective or imperfect material. Defective or unfit material found to have been laid shall be removed and replaced by the Contractor with sound and unobjectionable material without additional expense to the OWNER.

B. The Contractor shall be responsible to compensate the City's Project Management team and police details and materials testing for errors, defective work or damage caused by the Contractor. This will be done by direct invoice to the Contractor or monies deducted through invoices.

C. All materials furnished by the Contractor are subject to thorough inspections and tests by the Engineer.

D. All ordering lists shall be submitted by the Contractor to the Engineer for approval and shall be approved before the ordering of the materials.

6.34. SPIRITUOUS LIQUORS

The Contractor shall neither permit nor suffer the introduction or use of spirituous liquors upon the work embraced in this contract.

6.35. FINISHING AND CLEANING UP

In completing the backfilling of the trenches, etc. the Contractor shall replace all surface material to the satisfaction of the Engineer, and shall then immediately remove all surplus material, and all tools and other property belonging to him, leaving the entire street or surroundings free and clean and in good order, at no additional expense to the OWNER. The backfilling and removing of the surplus materials shall follow closely upon the completion of the work. The Contractor shall exercise special care in keeping rights-of-way and private lands, upon which work is to be performed, clean and free of debris at all times and to remove tools and other property belonging to

the Contractor when they are not being used.

6.36. CLEAN-UP AT CONTRACTOR'S EXPENSE

In case the Contractor shall fail or neglect, after backfilling, to promptly remove all surplus materials, tools and other incidentals, or promptly do the required repaving when ordered, the Engineer may, after 24 hours notice, cause the work to be done and the cost thereof shall be deducted from any monies then or thereafter due the Contractor.

6.37. RIGHTS OF ACCESS

Nothing herein contained or shown on the Drawings shall be construed as giving the Contractor exclusive occupancy of the work areas involved. The OWNER or any other Contractor employed by the OWNER, the various utilities companies, Contractors or Subcontractors employed by the Federal, State or Local governmental agencies or other utility firms or agencies involved in the general project or upon public rights-of-way, may enter upon or cross the area of work or occupy portions of it as directed or permitted. When the territory of one contract is the convenient means of access to the other, each Contractor shall arrange their work in such manner as to permit such access to the other and prevent unnecessary delay to the work as a whole.

6.38. LOADING

No part of the structures involved in this contract shall be loaded during construction with a load greater than is calculated to carry with safety. Should any accidents or damage occur through any violation of this requirement, the Contractor will be held responsible under their Contract and bond.

6.39. EXISTING UTILITIES OR CONNECTIONS

A. The Location of existing underground pipes, conduits and structures, as may be shown in the project drawings, has been collected from the best available sources and the Engineer and the OWNER together with its agents does not guarantee, expressly or by implication, the data and information in connection with underground pipes, conduits, structures, electric and telephone ducts and lines, vaults and such other parts as to their completeness nor their locations as indicated. The Contractor shall assume that there are existing water, gas, electric, and other utility connections to each and every building enroute, whether they appear on the Drawings or not. Any expense and/or delay occasioned by utilities and structures or damage thereto, including those not shown, shall be the responsibility of the Contractor, at no additional expense to the OWNER.

B. Before proceeding with construction operations, the Contractor shall make such supplemental investigations, including exploratory excavations by hand digging, as he deems necessary to uncover and determine the exact locations of utilities and structures and shall have no claims for damages due to encountering subsurface structures or utilities in locations other than shown on the Drawings, or which are made known to the Contractor prior to construction operations. The Contractor shall be responsible and liable for all damages to the existing utilities and structures.

6.40. COMPLETENESS OF WORK

In addition to the specified or described portions, all other work and all other materials, equipment and labor of whatever description which are necessary or required to complete the work, or for carrying out the full intent of the Drawings and Technical Specifications, as interpreted by the Engineer, such work, labor, materials, and equipment shall be provided by the Contractor, and payment therefor shall be considered as having been included in the prices stipulated for the appropriate items of work as listed in the Bid.

6.41. VEHICLE CROSSINGS

As required or directed by the Engineer, the Contractor shall install in selected locations suitable plank, timber or steel crossings substantially bound and reinforced to sustain vehicular traffic across trench or other excavations. Crossings shall be constructed with side and usable approaches for use by the traveling public, private property OWNERs or firefighting equipment. No separate payment will be made for this work, but the cost shall be included in the prices stipulated for the appropriate items of work as listed in the Bid.

6.42. CLEANING FINISHED WORK

After the work is completed, the sewers, manholes, and structures shall be carefully cleaned free of dirt, broken masonry, mortar, construction and other debris and left in first class condition ready for use. All temporary or excess materials shall be disposed of and the work left broom-clean to the satisfaction of the Engineer.

6.43. DUST CONTROL

At all times during the progress of the work under this contract and when directed, the Contractor shall furnish and apply calcium chloride at the sites of the work over the surfaces of all earth piles along excavations, earth stockpiles and surfaces of refilled trenches, and as directed by the Engineer. Payment will be made for furnishing and applying calcium chloride and water for dust control in accordance with the unit price for this work submitted as part of the Bid.

6.44. CARE OF THE WORK

The Contractor shall be responsible for all damages to persons or property that occur as a result of their fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all material delivered and work performed until completion and final acceptance, whether or not the same has been covered by partial payments made by the OWNER.

6.45. INDEMNITY

A. The Contractor will indemnify and hold harmless the OWNER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the Work, including but not limited to , that any such claim, damage, loss or expense, etc., provided that any such claim, damage, loss or expense; a) Is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and; b) Is caused in whole or in part by any negligent act or omission of the Contract any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

B. In any and all claims against the or OWNER or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under GENERAL CONDITIONS, Section 5.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation acts, disability benefit acts or other employee benefit acts.

C. The obligation of the Contractor under paragraph GENERAL CONDITIONS, Section 5.30 shall not extend to the liability of the Agency, their agents or employees arising out of a) the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications or; b) the giving of or the failure to give directions or Instructions by the Agency their agents or employees provided such giving or failure to give is the primary cause of injury or damage.

6.46. CONSTRUCTION SCHEDULE

A. In addition to the other requirements specified and prior to issuance of the Notice to Proceed, the Contractor shall confer with the OWNER and the Engineer for the purpose of drafting a construction schedule satisfactory to the OWNER and the Engineer which is to include all the work of this contract. The Contractor shall perform the work of this contract to conform to the construction schedule as approved by the OWNER, except the OWNER reserves the right to amend and alter the construction schedule, as approved, at any time, in a manner which it deems to be in the best interests of the OWNER to do so.

B. The Contractor shall arrange their work under this Contract to conform with the construction schedule as it shall be revised biweekly by the Contractor, at no additional expense to the OWNER. The Contractor shall notify the Engineer immediately of any circumstances which may affect the performance of the work in accordance with the current construction schedule. Failure to maintain schedule will delay in processing pay applications.

6.47. OTHER WORK

The OWNER reserves the right to do any other work which may connect with, or become a part of, or be adjacent to the work embraced by this Contract, at any time, by contract work or otherwise. The Contractor shall not interfere with or obstruct in any way the work of such other persons as the OWNER may employ and shall execute their own work in such manner as to aid in the executing of work by others as may, be required. No backfilling of trenches or excavations will be permitted until such work by the OWNER is completed.

6.48. CHANGES AND MODIFICATIONS

The OWNER reserves the right to delete or cancel any item or items or parts thereof as listed in the Bid, without recourse by the Contractor. The OWNER also reserves the right to add to any item or part thereof as listed in the Bid. The compensation to be paid the Contractor for such additional extension, appurtenance or item shall be made under the applicable items as listed in the bid. Where no applicable items are provided in the bid for such additional extension, appurtenance or item, the compensation to be paid the Contractor shall be as set forth under GENERAL CONDITIONS, Section 5.10. No further mobilization charges shall be considered for changes or modifications in the work.

6.49. LAYOUT OF WORK

A. The Contractor shall provide all materials, labor, equipment, etc., necessary to layout the work and shall be responsible for all lines, grades, elevations, measurements, etc. conforming to the Americans with Disabilities Act.

B. The Contractor shall employ a Professional Engineer or Land Surveyor, registered in the State of Rhode Island, for establishing all lines, levels, grades, elevations, measurements, dimensions, locations, etc. The Engineer or Land Surveyor proposed for this work must be approved by the Engineer and the OWNER. In addition, as part of the layout of work, he shall be placed at the disposal of the Engineer and OWNER, from time to time as required, for checking purposes.

C. The Contractor shall establish control points, at the direction of the Engineer suitable for the layout of all utility work, both public and private.

D. No separate payment will be made for this work, but the cost shall be included in the prices stipulated for the appropriate items of work as listed in the Bid.

E. To assist in the layout of the work, survey data prepared by the Engineer, which has been submitted to the OWNER, will be made available to the Contractor.

6.50. PROTECTION OF LIVES AND HEALTH

A. In order to protect the lives and health of their employees under the Contract, the Contractor shall comply with all pertinent provisions of the U.S. Department of Labor, "Williams-Steiger Occupational Safety and Health Act of 1970", and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or Causing loss of time from work, arising out of and in the course of employment on work under the contract.

B. The Contractor alone shall be responsible for the safety, efficiency and adequacy of their plant, appliances and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

C. The Contractor shall be solely responsible for the acts and omissions of their agents, employees and their Subcontractors and their agents and employees and shall hold the Engineer and the OWNER harmless and defend the Engineer, and the OWNER against damage or claims for damages arising out of injuries to others or property of others which result from said acts or omissions.

6.51. SUBSURFACE STRUCTURES AND UTILITIES

A. The Contractor is responsible for confirming the location of all underground utilities prior to the commencement of construction. The contractor shall be responsible for all underground utility lines and structures; active or not and shall maintain a close and constant contact with all utility companies or agencies involved.

B. The Contractor shall make all supplemental investigations including exploratory excavations, by hand digging, as he seems necessary to uncover and determine the exact locations of utilities and structures and shall have no claims for damages due to encountering subsurface structures or utilities.

6.52. CONTRACTOR'S RESPONSIBILITY FOR DAMAGED STORM DRAINS

The Contractor shall use care when working within or in the vicinity of existing drainage structures. Any drainage structures or pipes damaged while carrying out any work on this contract shall be the Contractor's responsibility. Any drainage structures or pipes damaged by the Contractor while carrying out this Contract shall be replaced or repaired by the Contractor to the satisfaction of the OWNER at no additional charge to the OWNER.

6.53. PROTECTION OF CONSTRUCTION FEATURES

The Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, building vaults, adjoining property and such incidentals and to avoid damage thereto. The Contractor shall completely repair the damage caused by their operations at no additional expense to the OWNER.

6.54. TEST PITS

At locations where new utilities are to connect to existing utilities, the Contractor shall not proceed with the work until a test pit has been dug to determine existing conditions such as inverts of sanitary or storm sewers; outside diameter of water pipes so that sleeves or couplings can be correctly purchased, etc.

6.55. LOCATION OF WORK

The Contractor's attention is directed to the fact that work under this contract is performed strictly within the Wards, within the City of Providence.

6.56. PRE-CONSTRUCTION CONFERENCE

A. Within ten (10) days after award of Contract, a preconstruction conference shall be held between the OWNER, the Contractor, the Engineer and other City of Providence agencies having jurisdiction over the project area.

B. No work of any nature shall be performed by the Contractor until the pre-construction conference has been held, and all required permits have been obtained.

6.57. NOTIFICATION PRIOR TO CONSTRUCTION

A. Not less than ten (10) calendar days prior to the start of any work under this contract the Contractor shall send written notification of their intentions to the following:

1. DEPARTMENT OF PUBLIC WORKS
   700 Allens Avenue
   Providence, RI 02905
   Leo Perrotta, Director
   lperrotta@providenceri.gov
   (401) 680-7500

2. DEPARTMENT OF PLANNING AND DEVELOPMENT
   444 Westminster Street
   Providence, RI 02903
   Robert Azar, Deputy Director
   razar@providenceri.gov
   (401) 680-8524

3. RIPTA
   705 Elmwood Avenue
   Providence, RI 02907
   (401) 781-9400

4. RHODE ISLAND ENERGY
   280 Melrose Street
   Providence, RI 02907-2152
   Marisa Albanese
   MAAlbanese@rienergy.com
   (401) 784-7090

   Cc: Jim Paulette
   JIPaulette@rienergy.com

5. RIDOT
   Two Capitol Hill
   Providence, RI 02903
   Robert Rocchio, Chief Engineer
   (401) 222-2023

   Cc: Mike Sprague, Managing Engineer
   (401) 563-4221

6. VERIZON
   85 High Street
   Pawtucket, RI 02865
   Peter DeCosta, State Highway Coordinator
   (774) 409-3177

7. COX COMMUNICATIONS
   9 J.P. Murphy Hwy.
   West Warwick, RI 02893
   David Velilla, Right Of Way Agent II
   (401) 615-1284

8. PROVIDENCE WATER
   125 Dupont Drive
   Providence, RI 02907
   Mr. Peter LePage, Sr., P.E., Director of Engineering
   plepage@provwater.com
   (401) 521-6300 Ext. 7242

9. DEPARTMENT OF TELECOMMUNICATIONS
   1 Communications Place, West Exchange Street
   Providence, RI 02903
   Carolyn Bourbeau, Director of Telecommunications
   cbourbeau@providenceri.gov
   (401) 243-6000

10. NARRAGANSETT BAY COMMISSION
    1 Service Road
    Providence, RI 02905
    David Bowens, Engineering Manager
    (401) 461-6540
    dbowens@narrabay.com

    Cc: Margaret Goulet
    mgoulet@narrabay.com

B. This notification shall set forth the Contractor's proposed sequence of construction and shall give the approximate dates of when each street or phase of the work is expected to begin. The sequence of construction shall also state the expected completion dates of each street or phase of the work.

C. Copies of each notification shall be sent to the Engineering Division, Department of Public Works, 700 Allens Ave., Providence, Rhode Island 02905 (c/o Roger Biron ribron@providenceri.gov). The notifications shall reference the Project, include a description of the work to be performed, including street names, and shall indicate when the construction will start. Additionally, the Contractor shall request the name and telephone number of the person or department to be contacted when assistance is required, copies of all replies shall be forwarded to the Chief Engineer, Department of Public Works, 700 Allens Ave., Providence, Rhode Island 02905.

6.58. NON-INTERFERENCE WITH ADJACENT PROPERTIES

All work under this Contract shall be performed in a manner which will minimize interference with the normal neighborhood operations.

6.59. FIRE PROTECTION AND PREVENTION

A. Federal laws (Occupational Safety and Health Act) and all State and municipal rules and regulations with respect to fire prevention, fire-resistant construction and fire protection shall be strictly adhered to and all work and facilities necessary therefore shall be provided and maintained by the Contractor in an approved manner.

B. All fire protection equipment such as water tanks, hoses, pumps, extinguishers, and other materials and apparatus shall be provided for the protection of the Contract work, temporary work and adjacent property. Trained personnel experienced in the operation of all fire

protection equipment and apparatus shall be available on the sites whenever work is in progress and at such other times as may be necessary for the safety of the public and the work.

6.60. PLANIMETER

For estimating quantities in which the computation of areas by analytic and geometric methods would be comparatively laborious, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

6.61. DAILY REPORTS

The Contractor shall submit, on an approved form, daily activity reports for the duration of the project. The reports shall indicate all personnel currently employed on the work including each trade and every Subcontractor; all equipment and whether such equipment was idle for the particular day; a general description of all work accomplished; any authorized extra work (time and material reports shall be submitted on separate forms).

6.62. OTHER PROHIBITED INTERESTS

No official of the OWNER who is authorized in such capacity and on behalf of the OWNER to negotiate, make, accept or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the OWNER who is authorized in such capacity and on behalf of the OWNER to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

6.63. WATER

The Contractor shall provide and maintain at their own expense an adequate supply of water for their use for construction and domestic consumption, and to install and maintain necessary supply connections and piping for same, but only at such locations and in such manner as may be approved by the OWNER. All water shall be carefully conserved. Before final acceptance, temporary connections and piping installed by the Contractor shall be removed in a manner satisfactory to the OWNER.

6.64. ELECTRICITY

All electric current required by the Contractor shall be furnished at their own expense and all temporary connections for electricity shall be subject to approval of the Engineer. All temporary lines shall be furnished, installed, connected and maintained by the Contractor in a workmanlike manner satisfactory to the Engineer and shall be removed by the Contractor in like manner at their own expense prior to completion of the construction.

6.65. DRAWINGS

A. If included in a project's scope of work, the Contractor shall use the dimensions of the Drawings as shown. Measurements shall not be by scale. Full size details have preference over scale details, and large-scale details and photographs have preference over small.

B. If discrepancies exist between Drawings and Technical Specifications, or if necessary measurements and work specified or shown is obviously incorrect or impossible to execute, and/or if figures fail to check, the Contractor shall bring these facts to the attention of the Engineer. The decision of the Engineer as to the intention of the Contract Documents shall be

final. No work shall start until all such problems have been resolved.

6.66. PERMITS

A. Contractor to obtain all required permits to complete work at no additional expense to the OWNER.

B. Engineering Division, Department of Public Works Permits.

1. Sewer Permit

2. Road Opening Permit

C. Traffic Engineering, Department of Public Works

1. Providence Traffic Engineering permits are required for Posting Emergency No Parking Signs at work zones prior to the beginning of the workday, detour permits and lane/sidewalk closing permits. Traffic Engineering permits are required when work zones occupy public sidewalk or road or a detour is required.

2. The Contractor is responsible for the scheduling of the permit applications as described on the Traffic Engineering website (http://www.providenceri.gov/public-works/traffic-engineering). Permit applications shall be sent to Providence Traffic Engineering at least two business days in advance of the requested start date on the permit. The Contractor shall obtain approval from the PDPW or their agent as to the number and time frame of Posting Emergency No Parking Signs prior to scheduling. Failure to obtain traffic engineering permits may result in shutting down the job site and other fines. There will be no compensation paid to the Contractor for job shut down relating to the failure to obtain permits and other fines.

3. The Traffic Engineering permit fees for this project shall be waived.

D. Narragansett Bay Commission (NBC)

1. NBC Regulations: Section 4.5 Sewer Alteration Permit

2. Any person(s) planning to initiate road construction which will modify or expose structures such as, but not limited to, manholes, catch basins, and sewers owned by the NBC must obtain a sewer alteration permit before performing any alterations to the NBC's facilities. The sewer alteration permit application must be obtained from the NBC and the applicant shall submit the completed application and any required information prior to issuance of a sewer alteration permit.

E. Rhode Island Department of Transportation (RIDOT)

1. Physical Alteration Permit (PAP)

6.67. SIDEWALK WORK

A. Curing: All sections prone to pedestrian / vehicular movement shall be protected, as necessary, until proper curing has occurred. All vandalized sections shall be replaced at contractor's expense.

B. Dates: The Providence Department of Public Works does not allow pouring of cement concrete sidewalks between November 17 and April 15 of the next calendar year.

C. Sawcutting: Cutting shall take place at existing control and expansion joints only.

6.68. COORDINATION WITH OTHER CONTRACTS

A. The Contractor is hereby notified that multiple construction projects may be ongoing throughout the construction period. The Contractor shall attend bi-weekly meetings or as required by the OWNER, at a location to be determined, to assure cooperation between all involved parties.

B. Contracts that may require coordination include, but are not limited to:

1. Providence Water Main Replacement and Lining

2. Rhode Island Energy Main Replacement

3. Hurricane Barrier Road Cover Replacements

4. Hurricane Barrier Sluice Gate Repairs on Allens Avenue

5. Citywide Paving and Sidewalk Repairs

6.69. JOB SITE POSTERS

The contractor must comply with US Department of Labor requirements for job site posters per Exhibit A at the end of this Section.

6.70. LIST OF CONTRACT DRAWINGS

All work under this Contract shall be done in conformance with the RIDOT Standard Specifications for Road and Bridge Construction, Amended 2018, with all revisions, and the State and Federal Special Provisions included in the contract documents. Standard Details for this project are City of Providence Standard Details, 2017 Edition, with all revisions. Refer to RIDOT Standard Details, 2019 Edition, with all revisions, for all other standard details.

6.71. UTILITY AND MUNICIPAL NOTIFICATION AND COORDINATION:

A. The Contractor shall contact DIG SAFE at 1-888-DIG SAFE (1-888-344-7233) prior to construction.

B. The Contractor shall coordinate with the utility Companies and necessary municipal offices prior to the start of work.

C. Refer to SPECIAL CONDITIONS for utility company contacts.

6.72. SHOP DRAWINGS

The Contractor must develop and submit shop drawings, product data, and/or catalogue cut-sheets in accordance with the GENERAL CONDITIONS. At a minimum, shop drawings shall be submitted for:
A. Section 033000 – Cast-in-Place Concrete
B. Section 310519.13 – Geotextiles for Earthwork
C. Section 312000 – Earthwork
D. Section 312319 – Dewatering
E. Section 315000 – Excavation Support and Protection
F. Section 321723 – Pavement Markings
G. Section 333100 – Sanitary Utility Sewerage Piping
H. Section 331210 – Temporary Bypass Pumping Systems
I. Section 330513 – Manholes and Structures

J. Section 330130.80 – Point Repairs to Sanitary Sewer Lines
K. Section 330130.72 – Cured-in-Place Lining

6.73. SEQUENCE OF CONSTRUCTION/MAINTENANCE AND MOVEMENT OF TRAFFIC/WORK RESTRICTIONS

A. The Contractor is required to clean any catch basins before installing silt sacks to ensure that the silt sack functions correctly. Any construction debris, sediment, or silt at project completion shall be removed at the Contractor's expense. The Contractor shall perform an MS4 inspection as part of the catch basin cleaning (refer to Job Specific Specifications).

B. The Contractor shall note the allowable work durations for specific roadways. See Special Conditions, Section 6.99 for more information.

C. Action Required by Contractor:

1. Approval of the work sequence and time schedule is required before the start of any construction or other work associated with this contract. The proposed construction and time schedule must consider and address the safe vehicle passage through the project.

2. In addition to the requirements of the Standard Specifications for Road and Bridge Construction and the Special Requirements of other sections of these contract documents, the Contractor must adhere to the following requirements:

(a) The Contractor is advised that any signs and other traffic control devices shown on the Plans are minimum requirements, and it is the Contractor's responsibility to supplement these if necessary to ensure the public's safety. All Maintenance and Protection of Traffic devices shall be in place and approved by the City of Providence Division of Traffic Engineering prior to starting construction. All Maintenance and Protection of Traffic shall conform with the latest edition and revisions of the Manual on Uniform Traffic Control Devices (MUTCD). The Contractor must submit for approval a traffic control plan when implementing any changes to the details shown on the plans or when providing traffic control for situations differing from those shown on the plans, including subcontractor work.

(b) Any deviations from the requirements stated here or detailed in the plans, as well as any deviation from the approved construction sequence and time schedule, must be submitted to the City of Providence Division of Traffic Engineering in writing for approval a minimum of 24 hours prior to implementation.

(c) The construction operations of this project must be coordinated with the local community public safety officials. It is the Contractor's responsibility to coordinate the construction operations of this project with the local public safety officials. In case of an emergency, the Contractor will be required to move equipment to allow the passage of emergency vehicles. The safety of the residents of the area must be considered at all times.

(d) The Contractor shall work continuously to restore traffic signal operation to its intended purpose when replacing the traffic signal equipment. A police detail is required to direct traffic at the intersection at all times the traffic signal is inoperative. At no time shall the Contractor leave the site before restoring full traffic signal operations or with the approval of the Engineer provide traffic control as directed by the Engineer.

(e) The Contractor shall maintain one full travel lane (11 foot minimum) in each direction of travel at all times, except during the execution of the southbound detour, unless otherwise approved by the City of Providence Division of Traffic Engineering. Safe access and egress to side streets and all driveways must be maintained at all times unless otherwise directed by the City of Providence Division of Traffic Engineering.

The Contractor shall open the roadway to all parking and vehicle and pedestrian traffic at the end of each work day/night.

(f) Detours are permitted only upon written approval from the City of Providence Division of Traffic Engineering. The Contractor must submit a detour plan with written approval from the City of Providence Traffic Engineer.

(g) The Contractor shall be responsible for maintaining appropriate construction related signing at all times. Any signs not appropriate for the lane closures, speed limits or any construction activity taking place at any given time shall be removed or covered to the satisfaction of the City of Providence Division of Traffic Engineering.

D. The following definitions will apply:

1. Travel Lane - A travel lane must be at least 11 feet wide and must be paved with a hard smooth surface. This surface may be existing pavement, existing base course, or new pavement. Gravel or dirt surfaces will not be acceptable.

2. Pedestrian Way - A pedestrian way must have an unobstructed clear width of five feet (per ADA requirements) and must have a hard, smooth surface, and must conform to all handicapped accessibility requirements. The surface may be existing pavement, new pavement, or plywood. All wooden walkways shall meet the Engineer's approval for surface smoothness and deflection. If there is a drop-off in excess of six inches from the edge of the pedestrian way, a handrail conforming to all applicable standards shall also be provided. There shall be no additional compensation for the provision of Pedestrian Ways; all costs shall be considered incidental to the Contract.

E. Pedestrian ways to all building entrances including service entrances must be maintained at all times. The Contractor shall provide temporary access routes/ramps through construction areas to insure this access. The Contractor must provide for pedestrians to safely guide them away from broken and uneven pavement, open excavations, drop-offs, construction operations and other hazards at all times.

F. The Contractor shall backfill or place steel plates capable of supporting HS-20 vehicle loading over all trenches and excavations at the end of work each day except when otherwise directed by the City of Providence Division of Traffic Engineering. There shall be no additional compensation for backfilling, re-excavating and/or plating these trenches.

G. The Contractor shall install and maintain a Rhode Island Standard 26.2.0 barricade at each location where adjustments to grade and/or reconstruction of drainage and utility structures have been made until resurfacing work has been performed. Other types of protective devices may be used if approved by the City of Providence Division of Traffic Engineering.

6.74. LEGAL RELATIONS AND RESPONSIBILITIES TO PUBLIC UTILITIES AND FACILITIES

A. In those areas where the Contractor's operations are adjacent or proximate to underground utilities such as gas, electric, water, telephone, fire alarm, sanitary and storm sewers, the provisions of Section 105.06 of the Rhode Island Standard Specifications for Road and Bridge Construction shall be followed.

B. During the process of the work, the Contractor shall cooperate with the OWNERs of the utilities and permit their representatives access to the work to determine if their utilities are being endangered in any way.

6.75. WORK ADJACENT TO GAS LINES, WATER LINES AND TELEPHONE DUCTS

Extreme care, particularly when installing traffic signal poles, foundations, conduit, manholes, catch basins, drain pipes and handholes shall be exercised during construction in the vicinity of the gas

lines, water lines and telephone ducts. Complete coordination with the utility companies shall be maintained.

6.76. BUILDING UTILITY SERVICES

The Contractor is to assume building services connections (electric, gas, telephone, water, and sanitary) are present to all buildings. Locations are to be checked with appropriate utility companies. The Contractor shall follow the Dig Safe process in accordance with the State of Rhode Island specifications for road and bridge construction.

6.77. DAMAGE TO EXISTING UTILITIES

The Contractor shall check and verify the exact location of all existing utilities and service connections with Dig Safe. Any damage to the utilities, which are detailed by Dig Safe, shall be the Contractor's responsibility. Cost to repair such damage shall be borne by the Contractor.

6.78. LOCAL POLICE COMPENSATION

It will be the responsibility of the Contractor to retain the services of local police for traffic control and protection for this project, in consultation with the Department of Public Works.

6.79. PARKING SPACE(S) LOSS

When work requires the loss of any parking space (s), the Contractor will be responsible for obtaining temporary "No Parking" signs from the City of Providence Traffic Engineer and the posting of said signs. The Contractor shall also be responsible for the removal of said temporary signs when the parking space(s) is opened.

6.80. STORAGE OF CONSTRUCTION MATERIALS AND/OR EQUIPMENT

In addition to the requirements of Division I Part 100 Section 106.06 "Storage of Materials" of the Rhode Island Standard Specification for Road and Bridge Construction 2004 Edition, the Contractor shall submit for approval the location of Material & Equipment Storage to the Engineer. No materials shall be stockpiled in the Public Right-of-Way.

6.81. DISPOSAL OF SURPLUS MATERIALS

All existing or other materials not required or needed for use on the project, and not required to be removed and stockpiled, shall become the property of the Contractor and shall be removed from the site during the construction period and legally disposed of. No separate payment will be made for this work, but all costs in connection therewith shall be included in the unit bid prices for this Contract.

6.82. LOCATION OF SIGNS

The location of all new signs shall be marked in the field and approved by the City of Providence Division of Traffic Engineering prior to installation.

6.83. CONSTRUCTION REQUIREMENTS FOR TRAFFIC SIGNAL INSTALLATION

A. The Contractor will be allowed to activate the new controllers once the City of Providence Division of Traffic Engineering has determined the minimum system elements have been installed.

B. A factory representative must be available within 24 to 48 hours to field test the equipment and make any corrections necessary to ensure proper operation as shown on the plans, if necessary and requested by the City of Providence.

C. When an intersection is completed and activated by the Contractor, the Engineer will perform a preliminary inspection. The Engineer will provide the Contractor with a report containing the results of the Preliminary Inspection along with a list of work items needed to satisfy this portion of the construction inspection. If the Contractor informs the Engineer that items on the list have been corrected and a second inspection indicates items have not been corrected, the Contractor will be back-charged for the second inspection and all subsequent inspections necessary prior to the next phase of the inspection. This does not apply to items that malfunction due to technical failure.

D. After the items identified during the Preliminary Inspection are mitigated to the satisfaction of the Engineer, the second part of the inspection, or Central to Field Integration Inspection, will be conducted. The Engineer will provide the Contractor with a report containing the results of the Central to Field Integration inspection along with a list of work items needed to satisfy this portion of the construction inspection. If the Contractor informs the Engineer that items on the list have been corrected and a second inspection indicates items have not been corrected, the Contractor will be back-charged for the second inspection and all subsequent inspections necessary for final acceptance except the final inspection. This does not apply to items that malfunction due to technical failure.

E. It will be the Contractor's responsibility to extract signal timing values from the plans and install those timings on the controller. The signal timings must be checked and approved by the Engineer before the system is made fully operational.

F. All loop detectors (if applicable) shall be cut into the final pavement surface course in locations shown on the plans. Locations of the video detection zones shown on the plans are approximate. Final size and locations of the video detection zones shall be positioned in the field and tested in cooperation with the City of Providence Division of Traffic Engineering or its representative to ensure that detection zones are established to cover the approach width and that the detection system is functioning to the satisfaction of the City of Providence.

G. The proposed video detection cameras shall be located at the exact dimension called for on the plans, unless otherwise approved by the Engineer. Any existing traffic signal mounting hardware, brackets, arms, or safety chains that are damaged during construction or are deemed to be unsuitable for relocation (where called for on the plans) shall be replaced in kind and color by the Contractor at no additional cost.

6.84. SIDEWALK REMOVAL/INSTALLATION

A. The Contractor shall take all necessary precautions to prevent damage to walls and fences abutting sidewalks and driveways designated for replacement. Where required, new sidewalks shall meet said walls and fences. Prior to sidewalk removal, a sawcut shall be provided in all sidewalks to be removed a distance, to be determined by the City of Providence Department of Public Works (6 inches minimum) from the face of adjacent buildings, retaining walls, and fences. The final 6 inches (minimum) of sidewalk will be removed with caution under the City of Providence Department of Public Works' supervision. There will be no additional payment for labor or equipment necessary to meet this "remove with caution" requirement.

B. Any brick, paver, or stamped concrete/asphalt sidewalk, crosswalk, or roadway disturbed by construction activity shall be repaired by the Contractor at no additional cost. Any brick, paver, or stamped concrete/asphalt sidewalk, crosswalk, or roadway damaged or to be restored shall match the same materials that exist, including concrete base if appropriate, unless otherwise indicated on the plans, or directed by the Engineer.

6.85. PAVING NOTES

A. The locations of all utility gate boxes and heads shall be marked prior to paving and adjusted upwards after the leveling course has been installed.

B. The Contractor shall take extreme care to avoid tracking residue (pavement, tack coat, etc.)

from newly paved areas onto adjacent areas especially stamped crosswalks. Any surfaces where residue is detected shall be replaced at the expense of the Contractor.

6.86. CURB RAMPS

A. The final location of all curb ramps shall be coordinated in the field with the Engineer with proposed and/or existing locations of drainage structures, utility poles, light poles, and other appurtenances to ensure a clear pedestrian path. All proposed curb ramps shall be constructed in accordance with RIDOT curb ramp details and per the details on the Plans.

B. The installation of curb ramp curb will include the granite transition stones as well as the flush granite curb at the base of the ramp. In addition, a sawcut of the end sections abutting the 2-foot curb returns to be removed will be necessary (where applicable), to install the curb ramp transition curbs.

C. Any existing curb ramps disturbed by conduit installation or other construction activities shall be replaced with a new curb ramp in accordance with RIDOT curb ramp details including required curbing to match existing, if required.

6.87. DIFFERING SITE CONDITIONS, CHANGES, AND EXTRA WORK

Any changes in the original scope of work shall be in accordance with the GENERAL CONDITIONS.

6.88. SURVEY OF CURB RADII

All curb geometry and dimensions shown in the details are approximate. The Contractor shall survey all curb dimensions and radii prior to removal of curb.

6.89. COORDINATION WITH RIPTA

The Contractor shall coordinate with the Rhode Island Public Transportation Authority (RIPTA) to ensure that RIPTA remains operational at all times, as specified in the SPECIAL CONDITIONS.

6.90. RHODE ISLAND ENERGY REQUIREMENTS

A. Guidelines for backfill and compaction around gas pipes permanent backfill and compaction

1. Description

(a) This work shall consist of backfilling and compacting all disturbed material at and around existing gas pipes and facilities. Size of pipe, material, length of exposed pipe, location of pipe, etc. will all follow the same set of Standards and Specifications stipulated by Rhode Island Energy Company. If design plans call for gas pipes to be exposed and supported (sheeting methods not used), then at the time of backfill, all disturbed material below the invert of the gas pipe shall be removed and replaced with suitable roadway or trench excavation material or bedding material.

(b) The contractor will not be allowed to replace this disturbed material with the same existing material if it has now been mixed with adjacent silty subsoil (clays) and fines. Well-graded gravel and sands will be used to replace the unsuitable material when no excess suitable material is available on site. Soils with high humus or mineral content should not be used to for backfill because they can promote electrolytic or bacterial attack.

(c) Backfilling the gas pipe should begin immediately after the work in that location is complete.

(d) The region within 6" alongside and on top of the gas pipe shall be backfilled with padding sand (free of cinders, ash, and rock). In no case shall the material used for backfilling in this region contain any stones. Backfill shall consist of suitable materials (medium to coarse sands with little or no silts) placed in layers of not more than 8" to 12" after compaction.

(e) Trench spoil material shall be suitable for backfilling above the padding material as long as rocks with a diameter larger than 3" are removed. The layers shall be mechanically compacted to the industry standard of 95% or until a density comparable to the unexcavated material is achieved. In some instances, flooding with water is an acceptable method of compaction but only if the back-fill material is clean, coarse, and adequate drainage is existent. The above specified backfill material is essential in order to attain the degree of compaction necessary to avoid future settlement.

(f) Tracing Wire, if necessary, shall be installed 2” to 6” below Plastic gas pipes. Warning Tape shall be installed approximately 12” above the gas pipe.

(g) A minimum of 2" temporary pavement shall be applied over the trench as soon as possible.

2. Guidelines for Working Around Corrosion Control System Components Description

(a) This guideline shall control work around existing Corrosion Control components. Replacement of test stations, anodes and test wire leads shall comply with Standards and Specifications stipulated by Rhode Island Energy. If design plans call for work in the area of Corrosion Control components, care must be taken to prevent damage to such components.

3. General Rhode Island Energy Considerations

(a) The contractor shall perform replacement of damaged corrosion control test boxes, resetting of disturbed test boxes, and ensure a minimum of 12” of excess wire above the rim of the test box after set to finished grade. Wires shall not be pulled taught to achieve the 12” above the box, as this will cause stress on the wire connection at the main. Wires needing to be lengthened, damaged corrosion control components i.e. wires, or wire coating, shall require notification to the Corrosion Control Department (525-5610 or 474-5171) to initiate inspection/repair or replacement of the damaged components.

(b) Backfilling exposed Corrosion Control wire components should begin immediately after the work in that location is complete. The region within 6" alongside and on top of the connector wires shall be backfilled with padding sand (free of cinders, ash, and rock). Test wire leads must be kept with enough slack to prevent stress on the points where the wires connect to the gas main. Trench spoil material shall be suitable for backfilling above the padding material as long as rocks with a diameter larger than 3" are removed. The 8” to 12” backfill layers shall be mechanically compacted to the industry standard of 95%.

4. Efforts to Repair Gas Leaks Prior to Final Construction (Nic)

(a) The Contractor shall notify Rhode Island Energy Gas (Sean Gunter – 617-719-2726) prior to any permanent paving, sidewalk or finishing operations for the purpose of a leak survey.

(b) All efforts shall be made to minimize the time between road excavation/coldplane/reclamation so as to reduce gas leaks. The maximum time between road excavation/coldplane/reclamation is seven (7) calendar days.

6.91. CITY OF PROVIDENCE TECHNICAL SPECIFICATIONS

In addition to the standard and job specific specifications included in these Contract Documents, the construction in this Contract shall be in accordance with the City of Providence “Technical Specifications”.

6.92. PAVEMENT INFORMATION

Pavement restoration shall be in accordance with the RIDOT standard details and specifications. Pavement section shall, at a minimum, match existing pavement section at the payment limits, provided that the existing section meets RIDOT standards.

6.93. UTILITY PROBE INFORMATION

NOT USED

6.94. TESTING AND CERTIFICATION OF MATERIALS

A. The Contractor shall adhere to the RIDOT Materials Testing and Certification Schedule. Testing of materials will be per the RIDOT specifications unless determined otherwise by the OWNER.

B. Materials not meeting the requirements of the specifications will be rejected. Testing of materials will be completed by an OWNER approved testing agency, at the Contractor’s expense. Materials sample sizes shall be per the RIDOT Master Schedule for the Preparation of a Project Schedule for Sampling, Testing, and Certification of Materials, latest edition.

6.95. FIRST SOURCE ORDINANCE

The attention of prospective bidders is called to the fact this project is to be bid upon and executed under the City of Providence, Code of Ordinances Chapter 21 Art. III 1/2 First Source Agreements Sec. 21-91 through 21-96. This ordinance outlines requirements for hiring employees to work on this project. The attention of prospective bidders is called to the fact that reporting the efforts undertaken and progress towards achieving the requirements in this ordinance is a condition for payment. Compliance reporting shall be submitted with any contract payment requisition, in the format to be provided. This demonstration of compliance through such reports shall be a condition of the requisition for payment to be processed. Upon the contract being awarded to the successful bidder, a mandatory meeting will be scheduled to review the project requirements relative to the First Source Agreements and the process and protocols by which these goals will be achieved. At this meeting, specific forms and procedures for the documentation and achievement of these requirements by the successful bidder will be provided, discussed and agreed upon for the execution of the contract.

6.96. APPRENTICE REQUIREMENTS

Attention of prospective bidders is called to the fact this project is to be bid upon and executed under the City of Providence, Code of Ordinances Chapter 21 Art. II Section 21-28.1 c (1) and (2) relating to utilizing apprentices in the contract. This ordinance outlines requirements for utilizing not less than 15% of total hours worked by apprentices. The attention of prospective bidders is called to the fact that reporting the efforts undertaken and progress towards achieving the requirements in this ordinance is a condition for payment. Compliance reporting shall be submitted with any contract payment requisition, in the format to be provided. This demonstration of compliance through such reports shall be a condition of the requisition for payment to be processed. Upon the contract being awarded to the successful bidder, a mandatory meeting will be scheduled to review the project requirements relative to apprenticeship requirements and the process and protocols by

which these goals will be achieved. At this meeting, specific forms and procedures for the documentation and achievement of these requirements by the successful bidder will be provided, discussed and agreed upon for the execution of the contract.

6.97. AMERICANS WITH DISABILITIES ACT REQUIREMENTS

All sidewalks being constructed have been designed to comply with the ADA (Americans with Disabilities Act) requirements. A minimum clearance of thirty-six (36) inches of width at a point of narrowing, excluding curb width, and forty-eight (48) inches of continuous width elsewhere is required. Prior to installing any new sidewalks, the contractor must verify, by field review with the Engineer, that these requirements have been met. Sidewalk construction shall not commence without prior approval of the Engineer in circumstances where these requirements cannot be attained.

6.98. STORM WATER POLLUTION PREVENTION PLAN

Not Required

6.99. CONSTRUCTION DURATION/RESTRICTIONS

A. With the exception of emergency work, generally work shall be completed by Winter shutdown (or by the project specific completion date stipulated in the Notice to Proceed), and shall be made safe for pedestrians, bicyclists and motorists.

B. Reference preceding sections of these Contract Documents for restrictions.

6.100. DRIVEWAYS

A. The Contractor shall provide notice to abutters at least 24 hours before sidewalk or driveway work will be performed. When installing cement concrete driveways, the Contractor shall provide at least 48 hours' notice that the driveway will be inaccessible while grading, forming, pouring and curing. The notices shall state the Contractor's name, a statement that the Contractor is working for the Providence of Public Works, a contact name and phone number for the contractor and the date and time that the driveway will be accessible. The Contractor shall remove all warning tape and stakes when the driveway is accessible.

B. The Contractor shall also coordinate with the City Parking Administrator when residents are displaced during a driveway pour. The Parking Administrator will coordinate with the Providence Police Department to allow for overnight street parking.

6.101. SECURITY

A. The Contractor shall provide security personnel for all work which will otherwise be unattended during cure time or while the site is unattended during non-working hours. All work damaged during this cure time or unattended time shall be removed and reconstructed at the Contractor's expense.

6.102. DIG SAFE

A. The Contractor shall comply with the Rhode Island General Law, Chapter 39-1.2, "Excavation Near Underground Utility Facilities" which became effective on July 1, 1984.

B. Before commencing with the construction of any work, identify any water main, gas main, telephone duct, electric duct, and/or other utility present which is or could be in conflict with the proposed work.

C. Relocation of the affected utilities shall be done as directed by the Local Public Agency and in accordance with the requirements of the corresponding utility company.

D. The attention of the Contractor is directed to the fact that certain utility companies may not fall under the provisions of "DIG SAFE". Individual utility company notifications by the Contractor shall be necessary to insure proper notification and protection of all existing utilities affected by this Contract. This includes, but is not limited to Providence sewer and streetlight assets.

6.103. CONTRACTORS WORKING HOURS

A. Work shall be performed during normal business hours, Monday through Friday, 7:00 AM-5:00PM. Some jobs may require the Contractor to work outside normal business hours. In this event, the Contractor may request to work on Saturdays and Sunday or during the

B. night, only with approval by the City. Such restrictions shall not be the basis for damages or claims against the City.

C. The Contractor's attention is also directed to the fact that it may be deemed necessary to perform various items of work during off-peak traffic hours, during early morning or late at night. The City will dictate these special conditions prior to awarding work to the Contractor.

D. The Contractor shall not be entitled to any additional compensation from the City for any expenses including premiums on labor that may be incurred by change of working hours and/or scheduling.

6.104. CITY FORESTER

A. The Contractor shall be required to have all proposed tree work, which includes as a minimum all trimming, root pruning, tree removal, tree planting or tree well work approved by the City Forester.

B. The Contractor's attention is directed to the requirement that all sidewalks are to be a minimum of 36- inches wide, and the City Forester is to be notified when that minimum width cannot be met due to interference with an existing tree.

C. The Contractor shall coordinate the scheduling of the City Forester with the Engineer. The Engineer shall be present during the City Forester evaluation and document the outcome.

6.105. PROGRESS MEETINGS

A. The Engineer will schedule and administer progress meetings and specially called meetings throughout the duration of the Work if deemed necessary by the Engineer.

B. The time and location of such meetings shall be designated by the Engineer and shall be convenient for all parties involved.

C. The Engineer will, prepare agenda with copies for participants, preside at meetings, records minutes, and distribute copies to participants, and those affected by decisions made.

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APPENDIX

APPENDIX A: BID FORMS

APPENDIX B: CONTRACT FORMS

APPENDIX C: TECHNICAL SPECIFICATIONS

APPENDIX D: STANDARD DETAILS

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APPENDIX A:

BID FORMS

A. Form of Bid

B. Purchasing Department Documents and MBE/WBE Participation Forms

C. Certificate of Corporate Principal

D. Non-Collusion Affidavit of Prime Bidder

E. Certification of Non-Segregated Facilities

F. Bidder's Certification for Equal Employment Opportunity

G. Special Requirement for All Out-of-State Contractors and Firms

H. Certification with Regard to Performance of Previous Contracts and Subcontracts

I. Affidavit of Non-Discrimination

J. Certification of Non-Discrimination in Equal Employment Opportunity

K. Statement of Bidders Qualifications

L. Proposed Subcontractors

M. Schedule of Unit Prices

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C I T Y O F

F O R M O F B I D

P R O V I D E N C E , R H O D E I S L A N D

TO: PURCHASING OFFICE
3rd Floor City Hall
Providence, Rhode Island 02903

1. The undersigned, having familiarized (himself) (themselves) (itself) with existing conditions at the **CITY OF PROVIDENCE, ON-CALL SEWER AND DRAINAGE REPAIRS (BLANKET CONTRACT 2023-2025)** project affecting the cost of work, and with the Contract Documents (which includes the Invitation for Bids, Instructions to Bidders, Form of Bid, Form of Agreement, Form of Non-Collusive Affidavit, Addenda (if any), Standard Details, Technical Specifications, Form of Surety Bond(s); as prepared by the Department of Public Works, and on file in the office of the Department of Public Works, 700 Allens Avenue, Providence, RI 02905, hereby proposes to furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services including utility and transportation services, and to perform and complete all required work for the **CITY OF PROVIDENCE, ON-CALL SEWER AND DRAINAGE REPAIRS (BLANKET CONTRACT 2023-2025)** project and such other required and incidental work, complete, all in accordance with the above listed documents and for the unit prices for work in-place for the following items and quantities.

2. In submitting this Bid, the Bidder understands that the right is reserved by the Department of Public Works to reject any and all Bids. If written notice of acceptance of this Bid is mailed, telegraphed, or delivered to the undersigned within (90) days after the opening thereof, or at any time thereafter before this Bid is withdrawn, the undersigned agrees to execute and deliver an Agreement in the prescribed form and furnish the required bond within ten (10) days after the Agreement is presented to him/her for signature.

3. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person in respect to this Bid or any Bids for the Contract for which this Bid is submitted. Also attached is a Statement of Bidder's Qualifications.

4. The Bidder is prepared to submit a financial and experience statement upon request.

Bidder Signature and Acknowledgement of Addenda:

DATE: _____, 20_____

Official Address:

_____

_____

_____

Name of Bidder (Firm):

_____

By: _____ *(Signature)*

Title: _____

Bidder shall indicate, in space provided,
the earliest possible Project **Start-up Date:** _____, 20_____

ADDENDA: **The undersigned acknowledges receipt of the following Addenda, if any, and has included the provisions thereof in this Bid:**

Addendum No.	**Date**	**Addendum No.**	**Date**
_____	_____, 20____	_____	_____, 20____
_____	_____, 20____	_____	_____, 20____
_____	_____, 20____	_____	_____, 20____
_____	_____, 20____	_____	_____, 20____

C I T Y O F

MBE/WBE FORMS

P R O V I D E N C E , R H O D E I S L A N D

REFER TO BOARD OF CONTRACT AND SUPPLY RFP FOR REQUIRED MBE/WBE FORMS

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C I T Y O F

CERTIFICATE AS TO CORPORATE PRINCIPAL

P R O V I D E N C E , R H O D E I S L A N D

I, _____, certify that I am the _____, Secretary of the Corporation named as Principal in the within bond; that, who signed the said bond on behalf of the Principal was then _____of said corporation; that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and attested to for and in behalf of said corporation by authority of this governing body.

_____(Corporate Seal)

_____
(Title)

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C I T Y O F

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

P R O V I D E N C E , R H O D E I S L A N D

State of _____

County of _____

_____, being first duly sworn, deposes and says that:

(1) He is _____ of _____

(OWNER, partner, officer, representative, or agent) _____

, the Bidder that has submitted the attached Bid:

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid:

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, OWNERs, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement, any advantage against the Department of Public Works or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, OWNERs, employees, or parties in interest, including this affiant.

(Signed) _____

_____
(Title)

Subscribed and sworn to before me this

_____day of _____, 20____

_____

_____
(Title)

My Commission expires _____

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C I T Y O F

CERTIFICATION OF NON-SEGREGATED FACILITIES

P R O V I D E N C E , R H O D E I S L A N D

The Bidder certifies that he/she does not maintain or provide for his/her employees any segregated facilities at any of his establishments, and that he/she does not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. The Bidder agrees that a breach of this certification will be a violation of the Equal Opportunity Clause in any contract resulting from acceptance of this Bid. As used in this certification, the term "segregated facilities" means any waiting rooms, work rooms, 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, color, religion, or national origin, because of habit, local custom, or otherwise. The Bidder agrees that (except where he/she has obtained identical certification from proposed subcontractors for specific time periods) he/she will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00 which are not exempt from provisions of the Equal Opportunity Clause, and that he/she will retain such certifications in his/her files.

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

Date _____, 20_____

Official Address:

_____

_____

_____

_____

Name of Bidder (Firm):

_____

By _____
(Name)

_____
(Signature)

Title _____

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C I T Y O F

BIDDER'S CERTIFICATION FOR EQUAL EMPLOYMENT OPPORTUNITY

P R O V I D E N C E , R H O D E I S L A N D

In compliance with Executive Order 11246 Equal Opportunity (GC II, Section 210, or latest publication) the Bidder hereby certifies he shall comply with Bid Conditions, Affirmative Action Requirements, Equal Employment Opportunity, as provided in the attachment Shown on pages GC II - 47a to GC II - 47f, or latest publication.

Full name and address of individual or company submitting this Bid:

_____

_____

_____

_____

Signed _____

Name _____

Title _____

Date _____

Notice: Bid should be signed in ink by a person having proper legal authority, and the person's title should be given, such as "OWNER" in the case of an individual, "Partner" in the case of a general partnership, "President", Treasurer, or other authorized officer in the case of a corporation.

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C I T Y O F

SPECIAL REQUIREMENT FOR ALL OUT-OF-STATE CONTRACTORS AND FIRMS

P R O V I D E N C E , R H O D E I S L A N D

It is the understanding that any and all out-of-state firms and companies must be registered to do business in the State of Rhode Island with the Secretary of State's Office. Any false statements made in this regard will cause this Contract to become null and void at the option of the City, therefore, in accordance with this requirement the following statement is made:

I (we) being duly sworn officers of said company or firm, hereby declare and affirm that this company or firm is registered with the Rhode Island Secretary of State's Office to do business in Rhode Island.

_____
(Company or Firm)

Attest:

Signature _____ Name _____

Title _____

Note: If proposal is being made by an in-state contractor or firm, this form may be left blank.

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C I T Y O F

CERTIFICATION WITH REGARD TO PERFORMANCE OF PREVIOUS CONTRACTS AND SUBCONTRACTS

P R O V I D E N C E , R H O D E I S L A N D

The Bidder _____, proposed Subcontractor _____, hereby certifies that he/she ___HAS ___HAS NOT, participated in a previous contract or subcontract subject to the Equal Opportunity Clause, as required by Executive Orders 10924, 11114, or 11246 and that he/she ___HAS ___HAS NOT, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements:

Company _____

Signature _____ By _____

Date _____ Title _____

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7 (b)(1), and must be submitted by bidders and proposed subcontractors any in connection with the contracts and subcontracts which are subject to the Equal Opportunity Clause. Contracts and subcontracts which are exempt from the Equal Opportunity Clause are set forth in 41 CFR 60-15. Generally, only contracts or subcontracts of $10,000.00 or under are exempt.

Currently, Standard Form 100 (EEO-11) is the only report required by the Executive Orders or their implementing regulations. Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the

Executive Orders and have filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts

and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

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C I T Y O F

AFFIDAVIT OF NON-DISCRIMINATION

P R O V I D E N C E , R H O D E I S L A N D

State of _____

County of _____

_____, being first duly sworn, deposes and says that:

He is the _____of_____

a corporation organized and existing under the Laws of _____and the

Contractor for the _____

Project No.that he makes this affidavit for and on behalf of said Corporation; that during the period

_____, 20____to _____, 20____, the said corporation has maintained the practices of employment as required by federal, state, and city laws in regards to the hiring of employees for the aforementioned project and that in employment, upgrading, the demotion or transfer, recruitment or recruitment advertising; layoffs or termination, rates of pay or other forms of compensation; and selection for training including apprenticeship, that it has not discriminated against any employee or applicant for employment on the work covered by this contract because of race, religion, color or national origin.

Signed _____

Name _____

Title _____

Subscribed and sworn to before me this

_____day of _____, 20_____ (Seal)

Signed _____

Title _____

My commission Expires _____

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C I T Y O F

CERTIFICATION OF NON-DISCRIMINATION IN EQUAL EMPLOYMENT OPPORTUNITY

P R O V I D E N C E , R H O D E I S L A N D

The bidder represents the he/she

☐ **has** ☐ **has not** participated in a previous contract or subcontract to either the equal opportunity clause contracted in Section 202 of the Executive Order 11246;

that he/she

☐ **has** ☐ **has not** filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations; and that representations indicating submission of required compliance reports, signed by proposed subcontractors will be obtained prior to subcontract awards.

Full name and address of individual or company submitting this Bid:

_____

_____

_____

_____

Signed _____

Name _____

Title _____

Date _____

Notice: Bid should be signed in ink by a person having proper legal authority, and the person's title should be given, such as "OWNER" in the case of an individual, "Partner" in the case of a general partnership, "President", Treasurer, or other authorized officer in the case of a corporation.

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C I T Y O F

S T A T E M E N T O F B I D D E R ' S Q U A L I F I C A T I O N S

P R O V I D E N C E , R H O D E I S L A N D

Separate statements shall be submitted by the bidder with his/her proposal for Him/herself, the Designer, the Construction Contractor, and for major design or construction subcontractors. All questions must be answered completely. The date given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached pages keyed into this form. The bidder may submit any additional information he/she desires.

1. Name of Bidder _____ (Proper Name First)

2. Contact Person / Title _____

3. Permanent Main Office Address _____

4. Telephone _____

5. When Organized _____

6. If a Corporation, When Incorporated _____

7. How many years have you been engaged in the contracting business under your present firm or trade name? _____

8. State your current contracts in-hand. (Schedule the contracts showing amount of each contract and the appropriate anticipated date of completion.)

_____

_____

_____

_____

_____

_____

9. Will your firm be the Bidder, Designer, Construction Contractor, or Design or Construction Contractor for this project? _____

10. State the general character of work performed by your Company:

11. Have you ever failed to complete any work awarded to you? _____

    If so, where and why: _____

12. Have you ever defaulted on a contract? _____

    If so, where and why: _____

13. List the more important projects recently completed by your Company, stating the appropriate cost for each, and the month and year complete:

Projects	**Cost**	**Completion Date**

14. List the major equipment your Company has available for this project:

15. List the names of projects, OWNERs, architects, contract amounts, dates of completion, and percent of work accomplished with own forces which have been completed within the last five (5) years (or projects etc. which a partner or officer, while associated with another organization, was primarily responsible for:

Project Location	OWNER	Engineer/ Architect	Contract Amount	Date Completed	Contact Name/Phone

16. List the background and experience of all principal members of your organization:

Name	Background / Experience

17. State your firm's particular qualifications, services, etc. for completing the project on-time within the project's program:

18. Based on your knowledge of construction and the OWNER's program for the project, indicate a project completion date:

_____

19. Credit Available: _____

20. Give bank reference: _____

21. Will you, upon request, complete a detailed financial statement and furnish any other information requested by the OWNER?

_____

22. The Bidder hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the OWNER in verification of the recitals comprising this:

STATEMENT OF BIDDER'S QUALIFICATIONS, dated _____

this _____day of _____, 20_____

Name of Bidder _____

By/Title _____

State of _____

County of _____

Subscribed and sworn before me

____day of _____, 20_____

Signed _____

Title _____

My Commission expires _____

C I T Y O F

P R O P O S E D S U B C O N T R A C T O R S

P R O V I D E N C E , R H O D E I S L A N D

I, _____, the BIDDER, hereby propose to utilize the following named SUBCONTRACTORS for the CITY WALK PHASE2 project, Providence, RI, for the work items and/or estimated prices stated below and understand that the OWNER reserves the right to reject any subcontractor if investigation determines they do not meet federal requirements or are otherwise unacceptable for the Project.

1. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

2. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

3. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

4. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

5. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

6. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

7. WORK ITEM/DESCRIPTION: _____

_____

Estimated Value of Work: _____

Subcontractor: _____

Address: _____

_____

City/State/Zip-Code: _____

Telephone No.: _____

(Add additional pages if necessary)

C I T Y O F

SCHEDULE OF UNIT PRICES

P R O V I D E N C E , R H O D E I S L A N D

Part 1

LABOR RATES

1. Labor Rates per hour - includes insurance, fringes, and overhead
(Submission of Certified Payrolls required)

a. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

b. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

c. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

d. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

e. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

f. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

g. _____ Classification
$ _____ Standard Rate per hour
$ _____ Overtime Rate per hour

Use additional sheets if necessary

Part 2

EQUIPMENT RATES

2. Equipment Rates

a. _____ $ _____
Type Make Year Rate per hour

b. _____ $ _____
Type Make Year Rate per hour

c. _____ $ _____
Type Make Year Rate per hour

d. _____ $ _____
Type Make Year Rate per hour

e. _____ $ _____
Type Make Year Rate per hour

f. _____ $ _____
Type Make Year Rate per hour

g. _____ $ _____
Type Make Year Rate per hour

h. _____ $ _____
Type Make Year Rate per hour

I. _____ $ _____
Type Make Year Rate per hour

j. _____ $ _____
Type Make Year Rate per hour

k. _____ $ _____
Type Make Year Rate per hour

Use additional sheets if necessary

Part 3

MATERIALS & SUBCONTRACTOR COST MARKUP

3. Materials Cost Markup Percentage

a. Contractor's Cost plus
(Submission of Original Invoices required)

Percentage (Written)	Percentage (Figures)

4. Subcontractor Cost Markup Percentage

a. Contractor's Cost plus
(Submission of Original Invoices required)

Percentage (Written)	Percentage (Figures)

Part 4

ESCALATION RATES

5. Escalation Percentage for Labor

a. Contractor reserves the right to increase quoted Labor Rates for the Contract period:

January 1, 2024, thru December 31, 2024

Percentage (Written)	Percentage (Figures)

b. Contractor reserves the right to increase quoted Labor Rates for the Contract period:

January 1, 2025, thru December 31, 2025

Percentage (Written)	Percentage (Figures)

6. Escalation Percentage for Equipment

a. Contractor reserves the right to increase quoted Equipment Rates for the Contract period:

January 1, 2024, thru December 31, 2024

Percentage (Written)	Percentage (Figures)

b. Contractor reserves the right to increase quoted Equipment Rates for the Contract period:

January 1, 2025, thru December 31, 2025

Percentage (Written)	Percentage (Figures)

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APPENDIX B:

CONTRACT FORMS

A. Construction Agreement

B. Partial Release – Contractor

C. Final Release – Contractor

D. Partial Release – Subcontractor

E. Final Release – Subcontractor

F. Contract Bond for Complete Performance and Full Payment

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CONSTRUCTION AGREEMENT

BETWEEN

THE CITY OF PROVIDENCE, RI

AND

[CONTRACTOR NAME]

CITY OF PROVIDENCE, ON-CALL SEWER AND DRAINAGE REPAIRS (BLANKET CONTRACT 2023-2025)

This Construction Agreement ("Agreement") is made on the latest day undersigned by and between the City of Providence, City of Providence Department of Public Works (DPW), ("OWNER") and [CONTRACTOR NAME, ADDRESS, CITY, STATE, ZIP] ("Contractor") (jointly, "Parties").

Project Location: Citywide

Contractor agrees to complete the work identified by the DPW, on a case by case basis, presented to and agreed upon by the Contractor, for on-call sewer and drainage projects and emergency sewer and drainage repairs, associated work and restoration throughout the City, as needed, ("Project").

Regarding the Project, Owner and Contractor agree:

1. CONTRACT DOCUMENTS

1.1. This Agreement, the scope of work, invitation for bids, and any other documents referenced in or attached to this agreement are collectively referred to as the "contract documents," and include:

A. Request for Proposals ("RFP"), Specifications, and Addenda prepared and issued by the Department of Public Works (DPW) as part of the City of Providence, On-call Sewer and Drainage Repairs (Blanket Contract 2023-2025) awarded on [DATE];

B. Bid submitted by Contractor dated [DATE];

C. The City of Providence Contract Addendum: American Rescue Plan Act (ARPA) attached hereto (the "ARPA Addendum").

1.2. Each of the Contract Documents forms part of and is fully incorporated in this Agreement.

1.3. To the extent any of the Contract Documents that form part of and are incorporated in this Agreement differ or contradict the terms of this Agreement, the terms of this Agreement shall control, except that in the case of a difference or contradiction between the terms of this Agreement and the ARPA Addendum, the ARPA Addendum shall control.

2. SCOPE OF WORK AND AGREEMENT PRICE

2.1. Contractor, having examined the Contract Documents agrees to be bound by the Contract Documents.

2.2. Contractor agrees to furnish all required Project Management, labor, materials, equipment, competent supervision, tools, safety measures, transportation costs, proof of insurance, performance bond and payment bond (as directed by OWNER) and any and all other appurtenant items necessary for complete performance of the Contract Work in a good and workmanlike manner.

2.3. The Contract Work shall conform to all applicable laws, regulations and/or ordinances of any and all governmental agencies including Quasi and having jurisdiction over the Contract Work. All required standards required by the Utility Providers shall be strictly complied with unless otherwise confirmed in writing by the Engineer and OWNER.

2.4. Contractor agrees to perform the necessary construction, project installation and oversight work set forth in the Scope of Work for each on-call project.

2.5. Contractor agrees to perform the Contract Work strictly in accordance with the Contract Documents and subject to the final approval of OWNER for the "Not to Exceed Lump Sum" Price submitted by the Contractor for each on-call project. OWNER and Contractor may amend the Agreement Price only by a written Change Order executed by both Parties. Contractor shall not charge overtime or travel time to OWNER unless OWNER first approves such charges in writing.

2.6. At the discretion of the OWNER, emergency work may be performed on a time and material basis with a detailed account of labor and material costs associated with the work.

2.7. Contractor is responsible for the cleanup and removal of all debris associated with the Contract Work to assure the safety and protection of all persons and property associated with the Project.

2.8. If the progress schedule cannot be met due to business interruption and circumstances beyond the control of Contractor, the OWNER and Contractor shall discuss and document the cause of such delay and present to the OWNER to review and discuss reasonable means to complete the work to avoid further delay. No overtime work will be conducted without an agreed upon Change Order.

2.9. From Time to Time the Contractor may be given advanced notice of special events taking place within the Project Limit Lines that will require special attention to work around and/or otherwise provide detailed cleanup, minimize road openings and sidewalk closures as well other applicable tasks that may be required. These events will be required to be captured in the Project Schedule and worked around as necessary to accommodate the events and assure that efforts are made to accommodate the events.

2.10. Contractor is employed as an independent contractor to perform the Contract Work and is responsible to provide all tools, equipment and incidentals required to complete the Work.

2.11. Contractor has examined the Project Site and has acquainted themselves with local conditions, including readable availability of a project management Team, labor, sub-contractors, equipment and materials.

2.12. Based on the Contractors examination of the Project Site, the Contractor accepts all open and obvious conditions at the Project Site visible upon reasonable inspection as of the date of this Agreement. No allowances will be made after the date of this Agreement for any oversight,

error or omission by Contractor in assessing the Project Site with respect to the Scope of Work to be performed and the Agreement Price for conditions falling within these parameters.

3. PERFORMANCE AND WARRANTY

3.1. Time is of the essence.

3.2. Contractor shall cooperate with OWNER in scheduling and performing the Contract Work to avoid conflict, delay in or interference with any separate work of the OWNER or other engineers or contractors. Performance requirements may be included in task order, to be agreed to by the City and Contractor.

3.3. At OWNER's request, Contractor shall promptly provide OWNER with proof of the ordering of all materials, equipment and supplies required for complete performance of the Contract Work.

3.4. Within Ten (10) Calendar Days of the Notice to Proceed, the Contractor shall promptly provide OWNER with a schedule of work to be performed which shall be considered a living schedule and update a minimum of every two (2) weeks. Failure to submit and update may result in rescinding work and/or withholding of payment.

3.5. Contractor shall use only new material for the Contract Work. Contractor shall remove and replace promptly, at Contractor's own expense, all defective or nonconforming work or materials. Contractor shall promptly report to OWNER, in writing, any errors, inconsistencies or omissions relating to the Contract Work and any errors, inconsistencies or omissions in the Drawings and Specifications. Contractor may use salvaged materials with the approval of the OWNER provided environmental test reports are provided to assure they are not contaminated. Test reports shall be provided in advance of materials being brought to the site.

3.6. Contractor shall complete each aspect of the Contract Work in strict accordance with the standards set forth in this Agreement and the other Contract Documents. Notice to proceed will be issued, as projects arise, upon the Contractor's furnishing of insurance, bond, and execution of this Agreement.

3.7. The Completion Date as delineated in the OWNER's Notice to Proceed for each on-call project may be changed only by a written Change Order signed by the Contractor and OWNER. Contractor's failure to perform and timely complete each aspect of the Contract Work, excluding delays caused by OWNER or third party persons who are not under Contractor's control, in strict accordance with the Contract Documents, or delay of any work by other engineers, contractors or OWNER caused by Contractor, constitutes a material breach of this Agreement, and Contractor shall be responsible for all additional costs incurred by OWNER or other engineers or contractors, including overhead, profit, attorneys' fees and litigation expenses resulting from any such breach.

3.8. If Contractor, by its own fault or omission, fails to diligently pursue completion of the Contract Work, overtime work may be required by Contractor without additional compensation from OWNER.

3.9. In certain situations, Contractor may be required by OWNER to work overtime and, if Contractor is not in default under the Agreement, Contractor shall be paid additional compensation as agreed to in writing prior to performance of the overtime work. OWNER must approve in advance and in writing all overtime work for which Contractor seeks additional compensation and such overtime work will be addressed in a Change Order.

A. The Contractor shall provide Schedule of Rates for all Labor and Equipment as part of the Bid for the project. This rate table will be used for adjustments in costs in the event they

are required.

B. The rate Schedule will be reviewed during Bid Review process for fairness and will be part of the review for the De-Scope Meeting.

3.10. Contractor agrees to keep OWNER informed both verbally and in writing as to the progress of the Contract Work and shall perform the Contract Work faithfully and in such order as necessary to keep the overall Project on schedule and to avoid any delay in completion of the Project. Failure to updated project schedule may result in rescinding work and/or withholding of payment.

3.11. Contractor shall provide safe and proper facilities for inspection at all times during performance of the Contract Work including preparing and maintaining a **Safety Plan to be submitted prior to the start of Work**.

3.12. Contractor warrants that the Contract Work shall (i) be free of defects in material and workmanship for a period of Two (2) years except where prescribed to be for a longer period; (ii) comply with the Drawings and the Specifications or as otherwise agreed to by the Parties; (iii) be performed in safe and workmanlike manner by trained, qualified, and efficient workers, in strict conformity with construction best practices; and (iv) be constructed of new materials of the most suitable grade for the application and furnish satisfactory evidence to OWNER of the type and quality of materials so furnished and used. In the event that the Contract Work fails to meet any of the aforementioned warranties, Contractor shall have the right to cure any nonconforming or defective Work and may replace the defective Contract Work or reimburse OWNER for the Contract Work at the invoice or market price, within thirty (30) days after discovery of the breach of warranty. Contractor shall also, at its cost, remove all material, equipment, and Contract Work which does not comply with the project specific scope of work, Drawings, or meet the Specifications, or is otherwise defective, whether incorporated in the Project or not, and shall re-execute the Contract Work and correct any other work damaged thereby. If Contractor does not remove nonconforming or defective Contract Work promptly, OWNER may do so and restore such nonconforming Contract Work at Contractor's expense.

3.13. Contractor shall reimburse OWNER for all reasonable costs and expenditures made in the settlement of any claim against OWNER relating to nonconforming or defective Contract Work.

3.14. Neither acceptance of the Contract Work nor payment of some or all of the Agreement Price shall relieve Contractor of responsibility for faulty materials, equipment or workmanship. Contractor shall remedy, as soon as possible, defects appearing within two (2) years from the date of final payment, or within such longer period of time as provided by any manufacturer's warranty, and correct resulting damage to other work at no cost to OWNER.

4. ASSIGNMENT

4.1. Contractor shall not assign or sublet the whole or any part of this Agreement or any funds accrued or to accrue under this Agreement without the prior written consent of OWNER; any assignment or sublet without prior written consent or OWNER shall be voidable at the election of OWNER. OWNER retains the right to refuse any and all assignments or subletting in OWNER's sole and absolute discretion. Any attempt to assign this Agreement in whole or in part without OWNER's prior written consent constitutes a material breach of this Agreement.

5. CHANGES AND DELAYS

5.1. Contractor shall not deviate from the Contract Documents except on written order of OWNER, received by Contractor before beginning any deviation.

5.2. OWNER may make written changes in the Contract Documents which may add to or deduct

from the Contract Work without invalidating this Agreement. All work outside the scope of the Contract Work to which Contractor is directed to perform by OWNER or OWNER's authorized representative without an agreement as to the price or time for the work shall be preserved and resolved through the dispute resolution clause in Section 14 of this Agreement.

5.3. Unless a written Construction Change Directive has been issued to Contractor by OWNER directing that certain work be performed prior to agreement on extra compensation and/or time or in the event of a dispute as to whether the work is within the original Scope of Work, no extra compensation for extra work, materials or any time extension shall be allowed unless a written Change Order has been signed by OWNER, nor shall Contractor proceed with extra work without a written Change Order signed by OWNER. Compensation for any work added by a Change Order shall be in accordance with unit prices, applicable add/alternate prices, a lump sum price, or with the prior approval of OWNER, shall be performed on a time and material basis with a detailed account of labor and material costs associated with the work.

5.4. Recovery by Contractor for delays caused by OWNER shall be limited to time extensions only as set forth in an executed Change Order. Contractor shall not be entitled to damages or compensation for any losses on account of delay from any cause whatsoever, including, but not limited to, any act, neglect, omission, default or failure of performance by OWNER or separate contractors, failure to obtain required materials, delay in obtaining permits, or other conditions.

5.5. If the progress schedule cannot be met due to business interruption and circumstances beyond the control of Contractor, the OWNER and Contractor shall discuss and document the cause of such delay and present to the OWNER to review and discuss reasonable means to complete the work to avoid further delay. No overtime work will be conducted without an agreed upon Change Order.

5.6. If materials are not delivered promptly, OWNER may expedite or substitute delivery of material to be supplied by Contractor and back charge Contractor for any costs incurred.

6. PROTECTION OF THE WORK AND EMPLOYEES; SUPERVISION AT THE PROJECT SITE

6.1. Until the Contract Work is complete, Contractor shall effectively secure and protect the Contract Work and shall repair and/or replace all loss or damage to the Contract Work caused by the Contractor or anyone for whom Contractor is responsible.

6.2. Following completion of the Contract Work, Contractor shall be bound by the warranty obligations of Contractor and its subcontractors and suppliers.

6.3. Contractor shall at all times supply a sufficient number of skilled workers to perform the Contract Work in a timely and efficient manner. In addition. Contractor shall assign a competent person who shall supervise the performance of the Contract Work, be present at the Project Site at all times when Contract Work is being performed, and act as Contractor's representative at the Project Site for the purposes of coordinating Contractor's activities with those of the OWNER and others at the Project Site.

7. BREACH AND REMEDIES

7.1. Contractor shall be deemed to be in material breach of this Agreement if Contractor: (i) fails to perform the Contract Work in strict accordance with the Contract Documents or task order; (ii) fails to provide competent supervision or a sufficient number of properly skilled workers; (iii) fails to supply sufficient material or equipment of proper quality; (iv) fails to correct nonconforming or defective work promptly; (v) fails to perform any terms of this Agreement; (vi) is unable to meet its debts or fails to pay promptly for labor, material or other obligations; becomes financially insecure; (viii) disregards any law, including, without limitation, the

Environmental Laws, rules, regulations or ordinances applicable to the Contract Work; (ix) by negligent act or omission causes delay or interference with OWNER or separate contractors; (x) assigns this Agreement for any reason without the prior written consent of OWNER; or (xi) performs or fails to perform any act the commission or omission of which is defined elsewhere in the Contract Documents as a material breach of this Agreement or which would constitute a material breach at common law.

7.2. In the event of Contractor's breach, OWNER shall have the following remedies in addition to any other remedies available at law or in equity:

A. Upon five (5) days' written notice to Contractor, OWNER may declare Contractor in breach of this Agreement subject to the Contractor's right to cure, and after such time, the OWNER may (i) terminate the Agreement; (ii) after termination, employ one or more other contractors to complete the Contract Work; (iii) complete the Contract Work with its own forces; or (iv) employ some combination of the foregoing to complete the Contract Work. Upon Contractor's breach, Contractor shall assign all material, equipment, tools, services, and supplies, and all of Contractor's agreements and supply contracts to OWNER for the purpose of assisting OWNER's completion of the Contract Work by any of the foregoing means. Equipment and tools left on the Project Site subject to a security or rental agreement shall be returned to Contractor. Equipment or tools owned outright by Contractor left on the Project Site may be assigned to OWNER upon the termination of this Agreement resulting from Contractor's breach of the Contract Documents for use to complete the Project.

B. Contractor shall remain liable to OWNER for all costs incurred by Contractor in completing the Contract Work caused by Contractor's breach of the terms of this Agreement.

7.3. If Contractor breaches this Agreement, Contractor shall not be entitled to any further payments for Contract Work not completed until the Contract Work has been completed and accepted by OWNER and all above-described expenses have been paid by Contractor to OWNER. Contractor shall be liable to OWNER for all costs of completion of the Contract Work that exceed the balance due under this Agreement, and Contractor shall promptly pay all valid amounts owed to OWNER upon demand.

7.4. The OWNER will be in breach of this Agreement and in default if any of the following events occur. OWNER shall have five (5) days to rectify the situation after event occurs and is identified.

A. OWNER fails or refuses to pay on time (generally within 60 days of acceptance of Payment Application) any monies due under the Contract Documents;

B. OWNER fails or refuses to perform any obligation required under the Contract Documents.

8. INDEMNITY

8.1. To the fullest extent permitted by law, Contractor shall indemnify, defend, at the OWNER's option, and hold harmless OWNER, its respective employees, agents, officers, directors and representatives (collectively, the "Indemnified Parties") from, for, of, and against any and all claims, damages, losses, liabilities, demands, costs and expenses, including but not limited to attorneys' fees and litigation expenses arising out of or resulting from, in whole or in part, the performance of the Contract Work, or which are caused, in whole or in part, by any negligent act or omission of the Contractor, or by any of Contractor's subcontractors or suppliers, or anyone directly or indirectly employed by them. Excluded from this indemnity section is any claim directly attributable to the conduct and actions of the OWNER or arising out of any non-delegable duty owed by the OWNER.

8.2. To the fullest extent permitted by law, OWNER shall indemnify and hold harmless Contractor and its agents, officers, directors and employees from, for, of, and against any and all claims, damages, losses, liabilities, demands, costs and expenses, including but not limited to attorneys' fees and litigation expenses attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property which are caused, in whole, by any negligent act or omission of OWNER, or any of OWNER's separate contractors, or anyone directly or indirectly employed by them.

8.3. Such obligations shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this section.

9. INSURANCE

9.1. Contractor shall purchase and maintain the following insurance for limits in amounts no less than set forth below:

A. GENERAL LIABILITY INSURANCE – PROPERTY DAMAGE AND BODILY INJURY: One Million Dollars ($1,000,000) per Occurrence; Two Million Dollars ($2,000,000) Aggregate Limit.

B. OWNED, HIRED AND NON-OWNED AUTOMOBILE LIABILITY INSURANCE: for Bodily Injury, Wrongful Death and Property Damage; One Million Dollars ($1,000,000) per Occurrence; Two Million Dollars ($2,000,000) Aggregate.

C. WORKERS COMPENSATION AND OCCUPATIONAL DISEASE: including Employer's Liability-Statutory Limit, such Employer's Liability limits for bodily injury by accident or disease to not be less than Five Hundred Thousand Dollars ($500,000) each accident, Five Hundred Thousand Dollars ($500,000) each employee and Five Hundred Thousand Dollars ($500,000) policy limit.

D. UMBRELLA LIABILITY INSURANCE: Five Million Dollars ($5,000,000) per Occurrence; Five Million Dollars ($5,000,000) Aggregate.

E. POLLUTION LIABILITY INSURANCE: Two Million Dollars ($2,000,000) policy limit.

9.2. All required insurance coverages listed above shall be written on an occurrence-basis, and shall be maintained continuously, without interruption, from the date of commencement of this Agreement until the completion of the Contract Work or the date of final payment for the Contract Work, whichever occurs later.

9.3. Certificates of insurance acceptable to OWNER shall be submitted to OWNER before commencement of the Contract Work. The certificates of insurance and the insurance policies required above shall include a provision stating that the insurance coverage under each policy shall not be cancelled or otherwise allowed to expire until at least thirty (30) days' advance notice has been given directly to OWNER by the insurance company or companies.

9.4. The insurance policies required for general liability coverages, owned, hired and non-owned automobile liability coverage shall include OWNER (City of Providence and the City of Providence Recovery Office) as an additional insured and shall provide that these insurance coverages are primary and non-contributory in the event any additional insured is insured for the same coverages under another insurance policy or policies. Contractor shall provide copies of the endorsements from the carrier showing that these entities have been added as additional insured.

9.5. Nothing in the provisions of this Section shall modify, alter or otherwise affect the indemnity obligations of Contractor under Section 8 of this Agreement.

10. SAFETY

10.1. At its own expense and at all times, Contractor shall have the responsibility to and take all necessary precautions to protect persons and property at or adjacent to the Project Site from damage, loss, or injury resulting from performance of the Contract Work by the Contractor, its employees, subcontractors and others for whom Contractor is responsible.

10.2. If any accident occurs, person is injured, or property is damaged at or near the Project Site resulting from the performance of the Contract Work by Contractor, its employees, subcontractors or others for whom Contractor is responsible, Contractor shall immediately notify OWNER both verbally and in writing.

10.3. Contractor shall maintain a safety program that complies with all applicable laws and shall comply with all specific safety requirements promulgated by any applicable governmental authority and the City of Providence, including without limitation, the requirements of the Occupational Safety and Health Act ("OSHA"). Copies of the program shall be furnished to the OWNER upon request.

10.4. The Contractor shall submit a Life and Safety Plan prior to the execution of the Work including the Contractors COVID-19 Plan.

11. COMPLIANCE WITH LAWS

11.1. Contractor shall comply with all applicable federal, state, and local laws, codes, regulations and ordinances, including, but not limited to, the Fair Labor Standards Act, OSHA, workers compensation, social security, employment and wage and hour laws.

11.2. Contractor acknowledges this is a contract funded under ARPA, and therefore agrees to abide by all applicable terms in the ARPA Addendum.

11.3. Contractor shall not discriminate in the employment or advancement of any employee or applicant because of race, national origin, sex, color, age, religion, creed, physical handicap, Veteran's status or any protected class.

11.4. Contractor shall maintain all records and accounts for the employment of labor and the furnishing of materials and supplies in accordance with proper accounting and record keeping procedures and with all federal, state, and local laws, codes, regulations and ordinances. Copies of such records shall be provided to OWNER upon request.

12. PAYMENTS

12.1. For the satisfactory performance and timely completion of the Contract Work, OWNER shall pay Contractor the Agreement Price, subject to additions and deductions as herein provided. Payment will be less the aggregate of previous payments.

12.2. As a condition precedent to Contractor's right to payment, Contractor shall submit to OWNER pay applications in AIA format in MS Excel Format not locked based on an OWNER Approved Schedule of Values containing the following, and no pay applications will be accepted or processed for payment without the following:

A. Project Site name and address;

B. Date of the Contract Work;

C. CIP Number and Name

D. Milestone of Project Completion or line item percent complete in Schedule of Values.

E. MBE/WBE Utilization form

F. Apprenticeship utilization reports

G. Certified Payrolls

H. Partial Lien Releases

I. Cost Loaded Progress Schedule

J. Digital Progress Photos (Labeled)

K. Real time Punch List Items Addressed

12.3. Pencil pay applications shall be submitted digitally (unlocked MS Excel Format) to OWNER on a thirty (30) day billing cycle, by. OWNER shall have fourteen (14) days from receipt of a properly documented pay application to approve and certify the pay application. OWNER shall review each line item independently and base payment approval on each line item. In no case shall a disputed line item constitute a rejection of an entire pay application. In the case of a disputed line item(s), payment shall be made for all other line items and disputed line item(s) shall be settled in accordance with Section 14. OWNER shall generally issue payment within 60 days after the pay application is approved and certified.

12.4. Payment shall not be considered approval or acceptance of Contract Work or materials that do not comply with the Contract Documents.

12.5. Retainage in the amount of 5% will be withheld by the OWNER until final completion and acceptance of the project. If the Contractor is from out of state, the 5% retainage shall be increased to 8% to account for the extra 3% withheld for sales tax under RIGL 44-1-6.

12.6. If labor, materials or other charges relating to the Contract Work are not being paid by Contractor when due, OWNER may take all steps necessary to ensure such payments are made, including paying Contractor's bills directly, and charge such payments to Contractor.

12.7. OWNER may reduce or delay payment to Contractor for any and all of the following reasons: (i) unsatisfactory job progress; (ii) defective work or materials not remedied; (iii) disputed work; failure of Contractor to comply with the provisions of this Agreement; (v) legitimate and non-frivolous third party claims filed or reasonable evidence that a legitimate and non- frivolous claim will be filed; (vi) failure of Contractor to make timely payments for labor, equipment and materials; (vii) damage to OWNER or a separate contractor; (viii) reasonable evidence that the Agreement cannot be completed for the unpaid balance of the Agreement Price, (ix) failure to submit apprenticeship utilization reports, MBE/WBE utilization reports or updated construction schedule, or (x) punch lists not being addressed as project proceed (Real Time).

12.8. If Contractor's materialmen, suppliers, or subcontractors file a lien or other claim, or attempt to exercise any right or remedy against OWNER, OWNER’s interest in the Project Site, or the Project Site, Contractor shall immediately remove the lien or other claim, by payment, bond, or otherwise. If Contractor fails to act on the notice of lien or claim as outlined above within thirty (30) days, the OWNER may, in addition to its right to declare a material breach of this Agreement and exercise all rights and remedies, take whatever acts are necessary to remove the lien or resolve such claims and charge Contractor for the costs incurred.

12.9. Final payment to Contractor is conditioned upon and subject to the approval of the Contract Work by OWNER. As a condition of final payment, Contractor shall provide to OWNER "as built" drawings of the finished Project and all warranties, operating instructions and manuals and an agreement to hold OWNER harmless from all claims, all in forms acceptable to OWNER. Contractor also shall provide to OWNER a final release and lien waiver for labor and materials furnished by Contractor, its subcontractors and suppliers and from all lower tier subcontractors and suppliers who have served preliminary lien notices on OWNER or Contractor. The Contractor shall provide consent of the Surety Company as well.

12.10. Acceptance of final payment shall act as a waiver and release of any and all claims by Contractor, except unknown claims for personal injury or property damage caused by OWNER.

12.11. Final payment by the OWNER shall in no way relieve the Contractor for liability for its obligations to repair or replace faulty or defective Contract Work discovered after final payment. All such defenses Contractor may have to such claims are preserved.

13. RIGHTS AND REMEDIES

13.1. Duties and obligations imposed by this Agreement and rights and remedies available hereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available at law or in equity.

14. DISPUTES

14.1. Disputes to be resolved in accordance with the Rhode Island General Law Tittle 37, Chapter 37-16 et seq.

14.2. All claims, disputes, and other matters in question arising out of or relating to this contract or the performance or interpretation thereof shall be submitted to arbitration. Arbitration shall be commenced by a demand in writing made by one party to the contract upon the other within a reasonable time after the dispute, claim, or other matter in question arose but in no event after payment in full of the contract price has been made and accepted. The written demand shall contain a statement of the question to be arbitrated and a detailed statement of each item or matter in dispute and the name of the arbitrator appointed by that party. The other party to the contract within ten (10) days of the receipt of the written demand shall appoint an arbitrator and give notice in writing thereof to the party who commenced arbitration. The two (2) arbitrators appointed by the parties shall within ten (10) days of the date of the appointment of the second arbitrator select a third arbitrator who shall be designated as chairperson and who immediately shall give written notice to the parties of his or her appointment. The third arbitrator shall select a time, date, and place for hearing and give each party five (5) days notice in writing thereof. The date for hearing shall not be more than fifteen (15) days after the date of appointment of the third arbitrator. The award shall be made promptly by the arbitrators and, unless otherwise agreed by the parties or specified by law, no later than thirty (30) days from the date of closing the hearing, or, if oral hearings have been waived, from the date of the transmittal of the final statements and proofs to the arbitrators. The award shall be in writing and shall be signed by a majority of the arbitrators. It shall be executed in the manner required by law. The arbitrator shall provide a written explanation of the reasoning for the award. In the event the party of whom arbitration is demanded shall fail to appoint his or her arbitrator within the time specified or the two (2) arbitrators appointed by the parties are unable to agree on an appointment of the third arbitrator within the time specified, either party may petition the presiding justice of the superior court to appoint a single arbitrator who shall hear the parties and make an award as provided herein. The petitioner shall give five (5) days notice in writing to the other party before filing his or her petition.

15. GOVERNING LAW

15.1. This Agreement shall be governed by and construed under the laws of the State of Rhode Island, without regard to its conflicts of law principles.

16. ALL CHANGES TO AGREEMENT SHALL BE IN WRITING

16.1. This Agreement shall not be changed except by written agreement of OWNER and Contractor.

17. LEGAL EFFECT

17.1. In the event any provision contained herein is found to be legally unenforceable, all other provisions of this Agreement shall remain in full force and effect as if the unenforceable provision was never made a part of this Agreement.

18. INTERPRETATION

18.1. This Agreement is the result of negotiations between the parties and, accordingly, shall not be construed for or against either party regardless of which party drafted this Agreement or any portion thereof.

19. NO PARTNERSHIP

19.1. Nothing contained herein shall, or shall be deemed to, create any relationship between the Parties other than that of OWNER and Contractor.

20. FURTHER DOCUMENTS

20.1. The Parties shall execute and deliver all such documents and perform all such acts as reasonably requested by the other party from time to time, to carry out the matters contemplated by this Agreement.

21. RECORD KEEPING, AUDIT AND INSPECTION

21.1. Contractor shall retain all books and records pertaining to the provision of the Contract Work for a period of no less than five (5) years after completion of all Contract Work or the termination of this Agreement, whichever occurs earlier and shall, during such time, shall permit OWNER and its designated representative(s) to audit, inspect and make copies of all such books and records so maintained by Contractor. Any such audit and inspection shall take place during normal business hours upon reasonable prior notice to Contractor. The right to audit and inspect shall survive the termination of the Agreement.

22. NOTICE

22.1. All notices to either party pursuant to this Agreement shall be in writing and signed by a duly authorized representative of the party giving such notice and shall be served either in person, by overnight delivery service or by certified mail, return receipt requested, to the respective address for each party given in the Agreement.

23. AUTHORITY

23.1. The individuals executing this Agreement on behalf of the parties represent they are duly authorized to sign on behalf of the parties and bind the Parties hereto.

24. COUNTERPARTS

24.1. This Agreement may be signed in counterparts.

25. NOTICES

25.1. No notice, consent, approval or other communication given in connection herewith shall be validly given, made, delivered or served unless in writing and delivered by hand, email, or by registered/certified United States mail to OWNER or Contractor, as the case may be. Correspondence shall be delivered to the respective mailing and/or email addresses set forth below, or to such other addresses as either party may from time to time designate in writing and deliver to the other party. Notices, consents, approval or communications shall be deemed given or received 24 hours after deposit in the mail, or immediately if hand-delivered or sent by email transmission. All written correspondence shall be followed by a telephone call within 24 hours of sending to confirm that it was received by the other party.

A. If to City:
Patricia A. Coyne-Fague, Esq., Director
Department of Public Works
700 Allens Avenue
Providence, RI 02905
401-680-7500
pcoynefague@providenceri.gov

cc:
Craig Hochman, Chief Engineer
401-680-7515
chochman@providenceri.gov

B. If to City of Providence Recovery Office:
Bret Jacob, Director of PVD Recovery Programs
City of Providence Recovery Office
25 Dorrance Street
Providence, RI 02903

C. If to Contractor:
[CONTACT NAME, TITLE]
[COMPANY]
[ADDRESS]
[CITY, STATE, ZIP]
[PHONE]
[EMAIL]

NOW, THEREFORE, the Parties execute this Agreement.

CITY OF PROVIDENCE DEPARTMENT OF PUBLIC WORKS

By: _____

Name (Printed): _____

Title: _____

Date: _____

CITY OF PROVIDENCE RECOVERY OFFICE

By: _____

Name (Printed): _____

Title: _____

Date: _____

[CONTRACTOR NAME]

By: _____

Name (Printed): _____

Title: _____

Date: _____

APPROVED AS TO FORM AND CORRECTNESS

By: _____

Name (Printed): _____

Title: _____

Date: _____

CITY OF PROVIDENCE CONTRACT ADDENDUM: AMERICAN RESCUE PLAN ACT (ARPA)

The contract to which this addendum is attached is made using federal assistance provided to the City of Providence by the U.S. Department of Treasury from the Coronavirus State and Local Fiscal Recovery Fund established pursuant to Sections 602 and 603 of the Social Security Act, as added by Section 9901 of the American Rescue Plan Act of 2021, Pub. L. No. 117-2 (March 11, 2021) ("ARPA"). The following terms and conditions apply to contractors and vendors entering this contract pursuant to ARPA, its applicable regulations, and/or as established by the U.S. Department of Treasury.

I. **Equal Employment Opportunity.** If this is a construction contract exceeding $10,000, Contractor and any subcontractors shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR Part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor." Further, the clause provided under 41 CFR § 60-1.4(b) shall be considered part of this contract.

II. **Davis-Bacon & Copeland "Anti-Kickback" Acts.** Contractor and any subcontractors shall comply with 40 USC §§ 3141- 3144 and 3146-3148 and 29 CFR Part 5, requiring that contractors pay wages to laborers and mechanics at a rate not less than the prevailing wages specified by the U.S. Secretary of Labor (wage determination RI20230001) and not less than once a week. Contractors and subcontractors must also comply with 40 USC § 276c, 18 USC § 874, and 29 CFR Part 3, requiring that deductions from workers' pay be permissible and that contractors and subcontractors maintain and submit weekly payroll statements. The City shall report all suspected or reported violations to the U.S. Department of Treasury.

III. **Contract Work Hours and Safety Standards Act.** If this contract exceeds $100,000 and involves the employment of mechanics or laborers, Contractor and any subcontractor shall comply with 40 U.S.C. §§ 3702 and 3704, as supplemented by U.S. Department of Labor regulations (29 CFR Part 5) requiring that laborers and mechanics receive overtime compensation (time and one-half pay) for hours they have worked in excess of 40 hours in one week and cannot be required to work in unsanitary, hazardous, or dangerous working conditions; provided, however, that these requirements do not apply to the purchase of supplies or materials ordinarily available on the open market or contracts for transportation. Violations under this Act carry a liquidated damages penalty of $10 per day per violation, which may be withheld by the City of Providence from the money payable to the Contractor.

IV. **Rights to Inventions Made Under a Contract or Agreement.** If this is a contract for the performance of experimental, developmental, or research work, Contractor shall comply with 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements."

V. **Clean Air Act and the Federal Water Pollution Control Act.** If this contract exceeds $150,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq., and the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. The Contractor agrees to report each violation to the City and understands and agrees that the City will, in turn, report each violation to the Federal Emergency Management Agency and the Regional Office of the U.S. Environmental Protection Agency (EPA).

VI. **Debarment and Suspension.** In accordance with Executive Orders 12549 and 12689, the Contractor shall not enter into any agreement, written or oral, with any subcontractor without

the prior determination by the City of Providence of the subcontractor's eligibility. A contractor or subcontractor is not eligible to receive funds if the contractor is listed on the Federal Consolidated List of Debarred, Suspended, and Ineligible Contractors.

VII. **Byrd Anti-Lobbying Amendment.** If this contract exceeds $100,000, Contractor must file the certification required under 31 U.S.C. § 1352 certifying 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 any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Contractor shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award.

VIII. **Procurement of Recovered Materials.** The Contractor must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, to the extent applicable and in accordance with 2 CFR § 200.323.

IX. **Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment.** Contractor is prohibited from obligating or expending grant funds to contract, re-contract, procure, or obtain equipment, services, or systems that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

X. **Domestic Preferences for Procurements.** Contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States, as defined by 2 CFR § 200.322(b) (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subcontracts and purchase orders for work or products under this contract.

PARTIAL RELEASE

WHEREAS, the undersigned Contractor supplied labor, materials, equipment and/or services to the OWNER, _____, relative to improvements made to the property owned by _____, which project was located at the street address of _____.

NOW, THEREFORE, the undersigned for and in consideration of payment in the amount of $_____, (for monies due Contractor through and including month/day/year) contingent upon the receipt of said payment, does hereby unconditionally and irrevocably waives and releases any and all actions, claims, demands, liens, damages, or any and all claims whatsoever against the OWNER, the Project or the property whether arising at law, in equity or under the Mechanic's Lien law in the State of Rhode Island, which Contractor has or may have against the OWNER or the property on account of labor, materials, equipment and/or services furnished for use at the project as of the date of the execution of this document. This Release does not release any pending change orders or retainage due or to become due to Contractor nor does this Release release any of the following items:_____.

The undersigned warrants that all costs for labor, materials, equipment and/or services incurred by Contractor or its employees, consultants, subcontractors, sub-subcontractors, suppliers and all tiers have been paid or will be paid out of these proceeds by the undersigned. The Contractor warrants that no obligations, legal, equitable, or otherwise will be owed to any person arising out of or from Contractor's work on the project that will not be satisfied by the payment set forth above for all work, labor, materials, equipment and/or services performed by

or furnished to Contractor on the project up to and inclusive of the date this document is executed.

Contractor agrees to indemnify, defend and hold harmless the OWNER from any claim, lien, damage, cost or expense brought by any employee, agent or consultant of Contractor, any subcontractor or lower tier subcontractor, and any material supplier relating to any labor, material and/or equipment furnished, supplied or performed for, or on behalf of the Contractor or the project to which payment was made to Contractor for the work performed.

By:

_____
(Name and Title)

STATE OF RHODE ISLAND

COUNTY OF _____

Subscribed and sworn to before me on this _____day of _____, 2021.

_____
NOTARY PUBLIC
My Commission Expires: _____

FINAL RELEASE

WHEREAS, the undersigned Contractor supplied labor, materials, equipment and/or services to the OWNER, _____, relative to improvements made to the property owned by _____, which project was located at the street address of _____.

NOW, THEREFORE, the undersigned for and in consideration of the final payment in the amount of $_____, contingent upon the receipt of said payment, does hereby unconditionally and irrevocably waives and releases any and all actions, claims, demands, liens or other claims whatsoever against the OWNER, the Project or the property whether arising at law, in equity or under the Mechanic's Lien law in the State of Rhode Island, which Contractor has or may have against the OWNER or the property on account of labor, materials, equipment and/or services furnished for use at the project as of the date of the execution of this document.

The undersigned warrants that all costs for labor, materials, equipment and/or services incurred by Contractor or its employees, consultants, subcontractors, sub-subcontractors, suppliers and all tiers have been paid or will be paid out of these proceeds by the undersigned. The Contractor warrants that no obligations, legal, equitable, or otherwise will be owed to any person arising out of or from Contractor's work on the project that will not be satisfied out of the full and final payment set forth above for all work, labor, materials, equipment and/or services performed by or furnished to Contractor on the project up to and inclusive of the date this document is executed.

Contractor agrees to indemnify, defend and hold harmless the OWNER from any claim, lien, damage, cost or expense brought by any employee, agent or consultant of Contractor, any subcontractor or lower tier subcontractor, and any material supplier relating to any labor, material and/or equipment furnished, supplied or performed for, or on behalf of the Contractor or the project to which payment was made to Contractor for the work performed.

_____

By:

_____
(Name and Title)

STATE OF RHODE ISLAND

COUNTY OF _____

Subscribed and sworn to before me on this _____day of _____, 2022.

_____
NOTARY PUBLIC
My Commission Expires: _____

PARTIAL RELEASE

WHEREAS, the undersigned subcontractor supplied labor, materials, equipment and/or services to the general contractor, _____, relative to improvements made to the property owned by (Name of OWNERs), which project was located at a street address of _____.

NOW, THEREFORE, the undersigned for and in consideration of payment in the amount of $_____, (for monies due Contractor through and including month/day/year) contingent upon the receipt of said payment, does hereby waive and release any and all actions, claims, demands, liens or bond claims against _____, its surety, the project, the OWNER and the property described herein whether arising at law, in equity or under the Mechanic's Lien law in the State of Rhode Island, which subcontractor has or may have against _____, its surety, the project and the property described herein on account of labor, materials, equipment and/or services furnished for use at the project as of the date of the execution of this document.

Upon presenting this signed waiver to _____, the above payment will be issued to the subcontractor in accordance with the terms of the subcontract agreement.

The undersigned warrants that all costs for labor, materials, equipment and/or services incurred by subcontractor or its employees, consultants, sub-subcontractors, suppliers and all tiers have been paid or will be paid out of these proceeds by the undersigned. The subcontractor warrants that no obligations, legal, equitable, or otherwise will be owed to any person arising out of or from subcontractor's work on the project that will not be satisfied by the payment set forth above for all work, labor, materials, equipment and/or services performed by or furnished to subcontractor on the project up to and inclusive of the date this document is executed.

Exempt from release are any retained amounts being withheld pursuant to the subcontract agreement on account of labor, materials, equipment and/or services furnished by subcontractor on the project.

(Name of Subcontractor)

By:

_____

(Name and Title)

STATE OF RHODE ISLAND

COUNTY OF _____

Subscribed and sworn to before me on this _____day of _____, 2022.

_____

NOTARY PUBLIC

My Commission Expires: _____

FINAL RELEASE

WHEREAS, the undersigned subcontractor supplied labor, materials, equipment and/or services to the general contractor, _____, relative to improvements made to the property owned by (Name of OWNERs), which project was located at a street address of _____.

NOW, THEREFORE, the undersigned for and in consideration of the final payment in the amount of $_____, contingent upon the receipt of said payment, does hereby unconditionally and irrevocably waive and release any and all actions, claims, demands, liens or bond claims against _____, its surety, the project, the OWNER and the property described herein whether arising at law, in equity or under the Mechanic's Lien law in the State of Rhode Island, which subcontractor has or may have against _____, its surety, the project and the property described herein on account of labor, materials, equipment and/or services furnished for use at the project, whether known or unknown by the subcontractor as of the date of the execution of this document.

Upon presenting this signed waiver to _____, the above payment will be issued to the subcontractor in accordance with the terms of the subcontract agreement.

The undersigned warrants that all costs for labor, materials, equipment and/or services incurred by subcontractor or its employees, consultants, sub-subcontractors, suppliers and all tiers have been paid or will be paid out of these proceeds by the undersigned. The subcontractor warrants that no obligations, legal, equitable, or otherwise will be owed to any person arising out of or from subcontractor's work on the project that will not be satisfied out of the full and final payment set forth above for all work, labor, materials, equipment and/or services performed by or furnished to subcontractor on the project up to and inclusive of the date this document is

executed.

This final release does not extinguish and is subject to subcontractor's warranty and contractual obligations set forth in its contract and/or agreement with _____.

(Name of Subcontractor)

By:

_____
(Name and Title)

STATE OF RHODE ISLAND

COUNTY OF _____

Subscribed and sworn to before me on this _____day of _____, 2021.

_____
NOTARY PUBLIC
My Commission Expires: _____

CITY OF

CONTRACT BOND FOR COMPLETE PERFORMANCE AND FULL PAYMENT

PROVIDENCE, RHODE ISLAND

KNOW ALL MEN BY THESE PRESENTS, THAT, _____of _____hereinafter called the "Contractor," and_____ AS SURETY are held and hereinafter called the "Surety," a corporation authorized to execute surety bonds under the laws of the State of Rhode Island, are held and firmly bounden unto the City of Providence, City of Providence Department of Public Works in the penal sum _____Dollars,($_____) lawful money of the United States of America, to the payment of which sum, well and truly to be made the Contractor and the Surety herein firmly bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT,

WHEREAS, the contractor did on the ___ day of ___ 20___, enter into a written Contract for _____in the sum of _____ ($.00).

NOW, THEREFORE, if the Contractor, its executors, administrators or successors, shall in all things well and truly keep and perform the covenants, conditions and agreements in the Contract and in any alterations thereof made as therein provided, on its part to be kept and performed, at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City of Providence, City of Providence Department of Public Works, and the Rhode Island Department of Transportation, as therein stipulated, and shall also promptly pay for all such labor performed or furnished, (which as to equipment shall mean payment of the reasonable rental value, as determined by the City of Providence, City of Providence Department of Public Works, and the Rhode Island Department of Transportation, for its use during the period of its use), as shall be performed or furnished for and are promptly paid for, whether or not the labor is directly performed for or furnished to the Contractor or is even directly performed upon the work covered by the Contract, and whether or not the materials are furnished to the Contractor or become component parts of the work, and whether or not the equipment is furnished to the Contractor or even directly used upon the work; and shall also pay for all Wages, Workers' Compensation, Public Liability, Fire Insurance, Federal and State Unemployment, Social Security and Compensation Taxes; then this obligation shall become and be null and void; otherwise it shall abe and remain in full force and virtue.

This Bond is subject to all such rights and powers of the City of Providence, City of Providence Department of Public Works and such other provisions as are set forth in the Contract and the Plans, Specifications and Proposal incorporated by reference in the Contract; and is subject also to all rights of the State and others which are set forth with respect to such a bond in RIGL §37-12-1 et. seq. and RIGL §37-13-14 and is subject to the provision that no extension of the time of performance of the Contract or delay in the completion of the work thereunder or any alterations thereof, made as therein provided, shall invalidate this Bond or release the liability of the Surety hereunder.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____day of _____, 20__, the name and corporate seal of each corporate party being hereto affixed, and these presents signed by its undersigned representative, pursuant to authority of its governing body.

In presence of: _____(Seal)

(Individual Principal) _____ _____

(Business Address including Zip)

(Title) _____ _____(Seal)

(Partnership)

_____

_____

(Business Address including Zip)

By: _____

Attest:

_____ _____

(Corporate Principal)

_____

(Business Address including Zip)

By: _____

(Affix Corporate Seal)

_____ _____

Attest:

_____ _____

(Corporate Surety)

By: _____

(Affix Corporate Seal)

Countersigned:

by _____

*Attorney-in-Fact, State of _____

(*Power-of-attorney for person signing for surety company must be attached to bond.)

APPENDIX C:

TECHNICAL SPECIFICATIONS

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CITY OF PROVIDENCE,
ON-CALL SEWER AND DRAINAGE REPAIRS
(BLANKET CONTRACT 2023-2025)

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract as provided by the OWNER for each on-call project, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Definitions.
2. Project information.
3. Work covered by Contract Documents.
4. Work under OWNER's separate contracts.
5. Contractor's use of site and premises.
6. Work restrictions.
7. Specification and drawing conventions.
8. Coordination with occupants.
9. Equipment.
10. Pipe locations.
11. Open excavations.
12. Test pits.
13. Maintenance of traffic.
14. Traffic control plan and devices.
15. Care and protection of property.
16. Protection, crossing and relocation of existing structures and utilities.
17. Water for construction purposes.
18. Maintenance of flow.
19. Cooperation within this contract.
20. Cleanup and disposal of excess material.
21. Restoration.
22. General obligations of the contractor.
23. Site investigation.
24. Construction sequencing.
25. Coordination with local agencies.
26. Public utilities.
27. Provisions for control of erosion.
28. Permits.
29. Debris disposal.
30. Re-inspection.
31. Contractor point of contact.
32. Approval of materials.
33. Handling and storage of materials.
34. Work on private property and site access.

35. Work on private property and site access.
36. Pre-construction photographs/videos of project.
37. Removal and replacement of signs, lampposts, and mailboxes.
38. Cooperation with other contractors and connection to work by others.
39. Protection and bracing of utility poles.

1.3 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

A. Project Identification: City of Providence, On-call Sewer & Drainage Repairs (Blanket Contract 2023-2025)

1. Project Location: Various Streets within the City of Providence, Rhode Island as determined by the OWNER.

B. OWNER: City of Providence.

1. OWNER's Representative: Roger Biron (401) 368-4685.

C. Engineer: To be determined.

1. Engineer's Representative: To be determined.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. CCTV and cleaning of sewer lines in areas designated by the OWNER or his representative using appropriate methods for given pipe size and materials.

2. Open-cut repairs and replacement of mainline sewer and drainage pipe.

a. Furnish all labor, materials, equipment and incidentals required to perform the rehabilitation and replacement of the existing Sewer and Drainage System in Providence, Rhode Island including but not limited to the following: preparatory cleaning of existing sewers; CCTV inspection; open cut repair and replacement of mainline sewer and drainage segments; reinstatement of service laterals as required in open-cut repair segments and all related work; and miscellaneous items as specified herein for future repairs identified and directed by the OWNER.

3. Cured-In-Place-Pipe (CIPP) Lining

   a. Furnish all labor, materials, equipment and incidentals required to perform the rehabilitation of the existing Sewer System in The City of Providence, Rhode Island including but not limited to the following: preparatory cleaning of existing sewers; CCTV inspection; installation of cured-in-place pipe lining; reinstatement of service laterals as required, including the removal of all coupons and excess resin, grouting of service lateral connections where needed and all related work; and miscellaneous items as specified herein for future repairs identified and directed by the OWNER.

   b. For lined segments greater than 1,000 linear ft, after the first 1,000 linear feet of CIPP liner have been installed, no additional lining will be allowed to proceed until the installation of the first 1,000 linear feet has been approved by OWNER or his representative.

4. Manhole & Catch Basin Installation

5. Furnish all labor, materials, equipment, and incidentals required to install new precast concrete manholes; catch basins; install new frames and covers; build new bench and invert; raise buried manholes/structures and connect to existing sewer to facilitate the rehabilitation of specific pipelines as identified by the OWNER for each on-call project. The work under this contract also includes paving, disposal of all removed materials, bypass pumping, any and all costs associated with obtaining access to the work site (including paved roadways), and all appurtenances and incidental work necessary to complete this contract and all else incidental to the completion of the project in its entirety as specified herein.

6. Miscellaneous Sewer and Drainage Repairs

   a. Furnish all labor, materials, equipment, and incidentals required to complete miscellaneous sewer and drainage repairs, improvements, new installations, and appurtenant work not enumerated in these documents as identified by the OWNER for each on-call project. The work under this contract also includes paving, disposal of all removed materials, bypass pumping, any and all costs associated with obtaining access to the work site (including paved roadways), and all appurtenances and incidental work necessary to complete each on-call project and all else incidental to the completion of the project in its entirety as specified herein.

1.6 WORK UNDER OWNER'S SEPARATE CONTRACTS

A. Work with Separate Contractors: Cooperate fully with OWNER's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under OWNER's separate contracts.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by OWNER's right to perform work or to retain other contractors on portions of Project.

B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to OWNER, OWNER's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
2. Coordinate use of premises with Engineer and the City of Providence as necessary.
3. Contractor shall assume full responsibility for security of all his/her and his/her subcontractors' materials and equipment stored on the site.
4. If directed by the OWNER or the Engineer, move any stored items which interfere with operations of OWNER or other contractors.
5. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to between 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet project specific requirements if approved by OWNER and authorities having jurisdiction. Requests to work other than regular working hours shall be submitted to the Engineer not less than 48 hours prior to any proposed weekend work or scheduled extended work weeks.

1. Weekend Hours: Only by approval from OWNER.
2. Early Morning Hours: Only by approval from OWNER.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:

1. Notify OWNER not less than two days in advance of proposed utility interruptions.
2. Obtain OWNER's written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to OWNER occupancy with OWNER.

1. Notify Engineer OWNER not less than two days in advance of proposed disruptive operations.
2. Obtain Engineer's OWNER's written permission before proceeding with disruptive operations.

E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages,

and other controlled substances on Project site is not permitted.

F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times. This includes personal protective equipment (PPE) with the Contractor's name and logo on it.

G. Employee Screening: Comply with OWNER's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with OWNER's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

D. Drawing Coordination: Requirements for materials and products identified may be project specific and will be determined as on-call projects arise. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.

1.10 EQUIPMENT

A. Furnish equipment which will be efficient, appropriate, and large enough to secure a satisfactory quality of work and a rate of progress which will ensure the completion of the work within the Contract Time. If at any time such equipment appears to be inefficient, inappropriate, or insufficient for securing the quality of work required or for producing the rate of progress

aforesaid, OWNER may order the Contractor to increase the efficiency, change the character or increase the equipment and the Contractor shall conform to such order. Failure of the OWNER to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.11 PIPE LOCATIONS

A. The OWNER reserves the right to make modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Future repairs will be identified by the OWNER and maps (if available) or a written scope of work with spatial coordinates shall be provided to the Contractor.

1.12 OPEN EXCAVATIONS

A. Permission from the OWNER shall be required to perform work in near or adjacent to property not owned by the City.

B. Adequately safeguard all open excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. Provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Remove bridges provided for access during construction when no longer required. The length or size of excavation will be controlled by the surrounding conditions but shall always be confined to the limits prescribed by the OWNER. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the OWNER may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight.

1.13 TEST PITS

A. The excavation of test pits may be required to locate underground pipelines or structures in advance of the construction. Backfill test pits immediately after their purpose has been satisfied and restore and maintain the surface in a manner satisfactory to the OWNER. The cost of these test pits shall be included in the lump sum bid price for each on-call project unless otherwise stated within the scope of work.

1.14 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the proper authority, place all excavated material so that vehicular and pedestrian traffic may be maintained at all times. If the construction operations cause traffic hazards, repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.

B. Detours around construction will be subject to the approval of the OWNER. Where detours are permitted, provide all necessary barricades and signs as required to divert the flow of traffic. Expedite construction operations while traffic is detoured. Periods when traffic is being detoured will be strictly controlled by the OWNER.

C. Take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in

progress. Be fully responsible for damage or injuries whether or not police protection has been provided.

D. Contractor shall adhere to all specific traffic management requirements included in Section 015526 and the limitations listed below:

1. All work within paved City streets, except maintenance of trench pavement and sewer testing, is prohibited between November 15th and April 15th, unless otherwise approved in writing by the OWNER.
2. In order to minimize disruptions to residents, ensure that final paving of each street will occur within one year of pipe installation, and to facilitate resident connections to the new sewers, the Contractor shall be required to install mainline sewers, services, initial paving, invert construction, pipe testing, raising structures and cleanup of the site on individual streets within this contract before being allowed to commence construction in other streets of the contract. All pipe testing, including mandrel testing, shall be completed within 120 days of pipe installation (mandrel testing shall commence after 90 day waiting period after pipe installation). The OWNER will issue street opening permits on a street-by-street basis and will not issue new permits until all work as described above is completed on the previous street.
3. Emergency vehicles and school buses shall be provided access to all streets at all times.
4. All streets shall be plated, as necessary, every night. No open excavations will be allowed after working hours.

1.15 TRAFFIC CONTROL PLAN AND DEVICES

A. The Contractor shall develop, implement, furnish, install, maintain, and remove a traffic control plan and devices as specified in Section 015526, and as directed by the City of Providence Police Department, and the Engineer. The Contractor shall be responsible for providing and maintaining all necessary MUTCD approved signs, barricades, lights, message boards, and such for the protection of the public and workers.

1.16 CARE AND PROTECTION OF PROPERTY

A. Be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the Engineer.

1.17 PROTECTION, CROSSING AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. Assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, traffic loop detectors, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables, whether or not they are shown on the Drawings or indicated in the scope of work. Carefully support and protect all such structures and utilities from injury of any kind. Immediately repair any damage resulting from the construction operations.

B. Assistance will be given to the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines and sewers), maintaining services to buildings and paying costs or charges resulting from damage thereto.

C. Notify all utility companies in writing at least 72 hours (excluding Saturdays, Sundays and Legal holidays) before excavating in any public way. Also notify Rhode Island Dig Safe, telephone 1-888-344-7233 at least 72 hours prior to start of work.

D. If, in the opinion of the OWNER or his representative, permanent relocation of a utility owned by the City of Providence is required, the OWNER or his representative may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under Article 11 of the Supplementary Conditions. If relocation of a privately owned utility is required, the City of Providence will notify the Utility to perform the work as expeditiously as possible. Cooperate with the City of Providence and Utility. No claim for delay will be allowed due to such relocation.

E. Coordinate the removal and replacement of traffic loops and signals, if required for the performance of the work, at no additional cost to the OWNER.

F. Perform any extra work required in crossing culverts, water courses, including brooks and drainage ditches, storm drains, gas mains, water mains, electric, telephone, gas and water services and other utilities. This work shall include bracing, hand excavation, backfill (except screened gravel) and any other work required for crossing the utility or obstruction.

G. In locations where existing utilities cannot be crossed without interfering with the construction of the work as required, remove and relocate the utility as directed by the OWNER or cooperate with the Utility Companies concerned if they relocate their own utility.

H. At pipe crossings and where designated by the OWNER, furnish and place screened gravel bedding so that the existing utility or pipe is firmly supported for its entire exposed length. The bedding shall extend to the mid-diameter of the pipe crossed. Screened gravel at pipe crossings shall be deemed included within the lump sum bid price for each on-call project unless otherwise stated in the project specific scope of work.

1.18 WATER FOR CONSTRUCTION PURPOSES

A. In locations where public water supply is available, the Contractor must coordinate with Providence Water.

B. The express approval of Providence Water shall be obtained before water is used. Hydrants shall only be operated under the supervision of Providence Water personnel.

C. If water restrictions are in force, obtain water elsewhere at no additional cost to this contract.

D. Contractor shall use a backflow prevention device when obtaining water from City sources.

E. Contractor shall meter all water obtained from City sources for use during this project.

1.19 MAINTENANCE OF FLOW

A. Provide for the flow of sewers, drains and water courses interrupted during the progress of the work, and immediately cart away and remove all offensive matter. Discuss the entire procedure of maintaining existing flow with the OWNER well in advance of the interruption of any flow.

1.20 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with Contractor and subcontractors or trades and assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the OWNER.

1.21 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the work, keep the site of operations as clean and neat as possible. Dispose of all residue resulting from the construction work and, at the conclusion of the work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and leave the entire site of the work in a neat and orderly condition.

B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and in other related Sections.

C. Disposal of excess excavated material in wetlands, stream corridors, and plains is strictly prohibited even if the permission of the property OWNER is obtained. Any violation of this restriction by the Contractor or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The Contractor will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

1.22 RESTORATION

A. Restore all areas to conditions that existed prior to construction. Restoration outside of the pipe trench limits required as a result of the installation of the pipeline shall be at the Contractor's own expense. Restoration within the pipe trench limits is included in the pipe items in the Bid Form.

B. Existing public and private driveways and sidewalks disturbed by the construction shall be replaced to the limits and thicknesses existing prior to construction.

C. Existing signs, lampposts and mailboxes that may be damaged by the Contractor or removed by the Contractor during the course of installing the new pipelines shall be reinstalled in a vertical position at the same location from which they were removed. Damaged items shall be replaced with an item equal to or better than the damaged items. A concrete anchor shall be provided as necessary, at no additional cost, to ensure a rigid alignment. Care shall be exercised in the

reinstallation of all items to prevent damage to the newly installed pipelines.

D. Existing curbing shall be protected. If necessary, curbing shall be removed and replaced after backfilling. Curbing which is damaged during construction shall be replaced with curbing of equal quality and dimension at the Contractor's expense. Granite curbing removed and reset shall conform to City of Providence Department of Public Work's standards. Joints between sections shall be pointed as required after resetting.

1.23 GENERAL OBLIGATIONS OF THE CONTRACTOR

A. General obligations of the Contractor shall be as set forth in the Contract Documents. Unless special payment is specifically provided in Section 012001, all incidental work and expense in connection with the completion of work under the Contract will be considered a subsidiary obligation of the Contractor and all such costs shall be included in the project specific lump sum bid price in connection with which the costs are incurred.

1.24 SITE INVESTIGATION

A. The Contractor shall satisfy himself as to the conditions existing within the project area, the type of equipment required to perform the work, the character, quality, and quantity of the subsurface materials to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the scope of work and related Sections. Any failure of the Contractor to acquaint himself with the available information will not relieve them from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The OWNER assumes no responsibility for any conclusions or interpretation made by the Contractor on the basis of the information made available by the OWNER.

1.25 CONSTRUCTION SEQUENCING

A. Will be addressed in pre-construction meeting, if necessary.

1.26 COORDINATION WITH LOCAL AGENCIES

A. Supply the local Police Department, Fire Department, Water Department, School Department, and the Public Works Department with the following information.

1. Notification of the work schedule and a list of streets and intersections where work will be in progress to be supplied at intervals as required by the Engineer.
2. Immediate notification of any drain, gas or water main breaks.
3. Areas where approved detours are in effect.
4. A list of after-hours telephone numbers by which appropriate Contractor personnel may be contacted in the event of emergencies.
5. The City of Providence Police department can be contacted at (401) 272–3121 24 hours per day.
6. The City of Providence Fire Department can be contacted at (401) 243-6060 during the business hours of 8:00am to 4:00pm.

B. The Contractor will be required to reimburse the OWNER for the actual cost of the services of City of Providence Public Works personnel required during other than regular working hours. The Department of Public Works can be contacted during the business hours of 8:30 am to 4:00 pm at (401) 680-7500.

C. The Contractor shall maintain pavement as specified in Section 321216 and shall provide the Public Works Department with an address, cell phone number at which he can be contacted when he is not at the site. Upon notification by the OWNER or the Engineer the Contractor shall promptly make such repairs as necessary to paved surfaces.

1.27 PUBLIC UTILITIES

A. Comply with the requirements of the State of Rhode Island Statute - Chapter 39-1.2, Section 1

for excavation within 100-ft of underground utilities. Compliance shall include the following:

1. Notify public utility companies in writing at least 72 hours (excluding Saturdays, Sundays and legal holidays) but not more than 30 days before excavating in areas where underground utility plant (pipes, cables, manholes, etc.) exist.
2. Provide the Utility Companies with a schedule of the activities in areas where the utilities exist.
3. Notify utility companies of any damage to their utilities resulting from construction operations.

B. Notify DIGSAFE at 1-888-344-7233 at least 72 hours before digging, trenching, blasting, demolishing, boring, backfilling, grading, landscaping, or other earth moving operations in any public ways, rights of way and easements.

1.28 PROVISIONS FOR CONTROL OF EROSION

A. Take sufficient precautions during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, and calcium chloride into the supplies and surface waters of the State. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

B. Disposal of drainage shall be in an area approved by the OWNER. Prevent the flow or seepage of drainage back into the drainage area. Drainage shall not be disposed of until silt and other sedimentary materials have been removed. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.

C. As a minimum, the following shall apply:

1. Staked bales of hay and/or silt fence shall be provided at points where drainage from the work site leaves the site, to reduce the sediment content of the water. Sufficient bales of hay shall be provided such that all flow will filter through the hay. Other methods which reduce the sediment content to an equal or greater degree may be used as approved by the Engineer.
2. Drainage leaving the site shall flow in a manner to prevent erosion.
3. Loaming and seeding or mulching of cross-country areas shall take place as soon after

laying or rehabilitating of the pipeline as practicable. This shall be considered part of the pipeline work and full payment for the pipeline work may not be made until it has been completed.

D. Measures for control of erosion shall be adequate to assure that turbidity in the receiving water will not be increased more than 10 standard turbidity units (s.t.u.), or as otherwise required by the State or other controlling body, in waters used for public water supply or fish unless limits have been established for the particular water. If surface water is used for other purposes, the turbidity shall not exceed 25 s.t.u. unless otherwise permitted.

E. When excavating in wetlands or floodplain, where no temporary diversion structure is required, place the excavated material on the uphill side of the trench so that the trench serves as a barrier between the excavated material and the wetland or floodplain.

1.29 PERMITS

A. Obtain all necessary permits required for proper execution of the project. Fill out all forms and furnish all drawings required to obtain the permits. A copy of each permit shall be submitted to the OWNER. All fees associated with these permits shall be paid by the Contractor as part of the work. Work shall not commence on any phase of the work requiring a permit until the permit is obtained.

B. Permit Responsibilities of the Contractor:

1. At no additional cost to the OWNER, the Contractor or its subcontractor shall be responsible for obtaining all permits, licenses, certifications or approvals required for the work of this contract not specifically listed in Section 011000. The Contractor's responsibility includes but is not limited to permits required for his equipment, work force, and of particular operations in the performance of the work or facility construction such as permits required for equipment, work force, transportation and storage of explosives, fuel storage, and air emission. The Contractor shall also be responsible for scheduling and coordinating inspections and receipt of local or state permits, approvals, or certifications not previously obtained or to be obtained by the OWNER for any tanks, piping and associated appurtenances, which are constructed, installed, tested, or removed as part of this Contract.
2. Obtain and pay for all new permits or permit amendments required due to deviations from permit applications submitted by the OWNER.
3. Draft copies of all permit applications and all other information or documents that will be submitted to regulatory authorities must be submitted to the Engineer a minimum of five days before the document is submitted to the permitting agency.
4. Provide two copies of all permits obtained and of all notifications that permits are not required to the OWNER.
5. Copies of all permits obtained and all notifications from agencies or City departments that permits are not required.

1.30 DEBRIS DISPOSAL

A. Contractor shall transport all debris in watertight containers to an appropriate waste disposal facility, in accordance with all applicable local, state, and federal rules and regulations. Contractor to pay for disposal of all debris.

B. Contractor shall supply all necessary equipment and ramps to properly transfer debris into container. The cost for transporting debris (including tipping fees) to the landfill is included in the lump sum bid price for each project submitted by the Contractor.

1.31 RE-INSPECTION

A. The work performed on all pipes, service laterals, and manholes as part of this Contract shall be inspected by the OWNER or his representative prior to the expiration of the warranty. Any deficiencies noted during these inspections shall be repaired by the Contractor at no additional cost to the OWNER.

1.32 CONTRACTOR POINT OF CONTACT

A. Contractor shall provide OWNER with one main point of contact that shall coordinate and answer for all crews and schedules during the project's entirety. Contractor point of contact shall be available to meet with OWNER throughout the project as required.

1.33 APPROVAL OF MATERIALS

A. Unless otherwise specified, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished shall be subject to the inspection and approval of the OWNER or his representative. No material shall be delivered to the work without prior approval of the OWNER or his representative.

B. Submit to the OWNER or his representative, in accordance with Section 013300, data relating to materials and equipment proposed to be furnished for the work. Such data shall be in sufficient detail to enable the OWNER or his representative to identify the particular product and to form an opinion as to its conformity to the specifications.

C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the OWNER or his representative requires, either prior to beginning or during the progress of the work, submit additional samples or materials for such special tests as may be necessary to demonstrate that they conform to the requirements specified herein. Such samples shall be furnished, stored, packed and shipped as directed at the Contractor's expense. Except as otherwise noted, the OWNER will make arrangements for and pay for the tests.

D. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of a claim against the OWNER or the Engineer.

E. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes and surfaces, provide such samples of workmanship or finish as may be required.

F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.34 HANDLING AND STORAGE OF MATERIALS

A. All materials and equipment to be incorporated in the work shall be handled and stored by the

manufacturer, fabricator, supplier, and Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting and any injury, theft or damage of any kind whatsoever to the material or equipment.

B. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous, reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling to a minimum.

C. All mechanical equipment subject to corrosive damage by the atmosphere if stored outdoors (even though covered by canvas) shall be stored in a building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the OWNER or his representative.

D. All materials which, in the opinion of the OWNER or his representative, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work and no compensation shall be given for the damaged material or its removal.

E. All pipe and other materials delivered to the job shall be unloaded and placed in a manner which will not hamper the normal operation of the existing work or interfere with the flow of necessary traffic. All pipe and other material delivered to the site shall be stored in an area accepted by the OWNER or his representative.

1.35 WORK ON PRIVATE PROPERTY AND SITE ACCESS

A. Coordinate site access on private property and cross-country easements with the OWNER and Engineer.

B. Take special care to preserve and restore private property and City easements to their original condition after work is completed.

C. Exterior Work on Private Property

1. Take all precautions necessary to minimize disturbance to retaining walls (stone, concrete block or other), patios, lawn areas, shrubs, trees, mailboxes, lamp posts, etc. and other features of the property. No cutting of trees or removal of shrubs will be allowed on private property or in easements unless approved by the OWNER. The Contractor will be responsible for restoration of the property to a condition at least equal to that which was existing prior to construction.
2. Minimize damage to existing landscape and yard features by properly handling and removing these items. Existing landscaping and other yard features shall be re-installed whenever possible. Damaged items or items deteriorated or for other reasons are unable to be re-installed shall be replaced with items equal to or better than existing. All items to be replaced and/or re-installed shall be approved by the OWNER.
3. If trees or shrubs which are not to be removed are damaged during construction to such degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced at the Contractor's expense by items of kind and quality at least equal to that existing at the start of the work.

4. Fences, walks, patios, lawn areas, stone walls and other private property which might be damaged by the Contractor's operations shall be removed and replaced at the Contractor's expense to a condition at least equal to that which was existing at the start of the work.
5. Grass areas damaged by the Contractor's operations shall be loamed and seeded and shall be restored to a condition equal to or better than that existing prior to construction.
6. All paved roads shall be repaired as specified in Section 321216.

D. Site Access

1. Access to the site shall be coordinated with and approved by the OWNER and Engineer. **Contractor shall not access private property until access agreements have been obtained and approved by the OWNER.**
2. Upon completion of the construction, all traces of access shall be removed and all yard features and landscaping which existed prior to the start of work shall be replaced or restored to their original condition.

E. Restoring Private Property and Rights-of-Way

1. The Contractor shall be responsible for all damage to private property and easements due to their operations. They shall protect from injury all walls, fences, cultivated shrubbery and vegetables, fruit trees, pavement, underground facilities, such as water pipe, or other utilities which may be encountered along the pipe route. If removal and replacement are required, it shall be done in a workmanlike manner so that replacement is equivalent to that which existed prior to construction.
2. Existing trees, shrubs, plants, and bushes shall be fully protected. The work shall also include removing and replacing trees, shrubs and bushes as required. It shall include the careful excavation of the root ball which shall be wrapped with burlap while out of the ground. The Contractor shall replant them after backfilling the trench, stake them in an upright position, and shall periodically water replanted trees, bushes and shrubs. The Contractor shall be fully responsible for ensuring that any and all trees, bushes and shrubs removed and replanted and returned to a viable state. Replanted items that fail to take or that are so damaged as to be unsuitable for replanting shall be replaced by the Contractor, at no additional cost to the OWNER, with a tree, bush or shrub equal to the one removed.
3. The Contractor shall be responsible for all damage to private property and belongings inside existing basements and structures. Contractor shall repair or replace damaged items to pre-construction conditions. Contractor shall clean all areas where work took place or used to conduct work and leave areas in the condition existing prior to construction.

F. Restoring Easements and Rights-of-Way

1. The Contractor shall be responsible for all damage to easements due to his operations. Protect from injury all walls, fences, cultivated shrubbery, vegetables and fruit trees which may be encountered along the route. If removal and replacement are required, it shall be done in a workmanlike manner so that replacement is equivalent to that which existed prior to construction.

1.36 PRE-CONSTRUCTION PHOTOGRAPHS/VIDEOS OF PROJECT

A. Prior to the excavation in any street or cross-country area, document existing conditions using pre-construction photographs and/or CCTV videos (as required by the OWNER in the on-call project scope of work) submitted on hard drives as detailed in Section 013300.

B. The hard drives shall be retained in a secure location throughout the duration of the project and shall then be turned over to the OWNER. An additional copy should also be turned over to the Engineer prior to construction for their review.

1.37 REMOVAL AND REPLACEMENT OF SIGNS, LAMPOSTS, AND MAILBOXES

A. Existing signs, lampposts, and mailboxes which may be damaged or removed during the course of installing the new pipelines shall be reinstalled in a vertical position at the same location from which they were removed. Replace damaged items with items of equal or better quality than the damaged items. Provide a concrete anchor as necessary, to ensure a rigid alignment. Exercise care in the reinstallation of all items to prevent damage to the newly installed pipelines.

1.38 COOPERATION WITH OTHER CONTRACTORS AND CONNECTION TO WORK BY OTHERS

A. At several locations, construction on other contracts may be carried on during the same period as construction under this Contract. It will be necessary for the Contractor to plan his/her work and cooperate with the other Contractor insofar as required to prevent any interference and delay for which he/she shall receive no other compensation than that agreed upon for this Item.

1.39 PROTECTION AND BRACING OF UTILITY POLES

A. Make all arrangements with the proper utility companies for bracing and protection of all utility poles that may be damaged or endangered by the operations. Work under this item shall include the related removal and reinstallation of guy wires, or support poles whether shown on the Drawings/scope of work or not.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011000

SECTION 012001

PRICE AND PAYMENT

PART 1 GENERAL

1.01 EXTENT OF WORK

A. Measurement

1. The quantities to be measured under the various items in the Bidder's Blank will be those quantities of work completed in accordance with the Specifications. The methods of measurement will be as stated hereinafter for the individual items.
2. For Unit Rate (Price) projects, all quantities, except for lump sum items, shall be unit priced and measured for payment to the nearest one-tenth of a unit.

B. Prices

1. The unit rates in the Bidder's Blank shall be full compensation for the work of the Contractor specified and shall include the cost of furnishing all labor, materials, equipment, and all work and expense incidental to and necessary to complete the work in accordance with the Specifications.

1.02 WORK NOT PAID SEPARATELY

A. Delivery

1. Payment for equipment delivery, storage or freight is included in the prices for the various items in the Bidder's Blank, and therefore no other separate payment will be made.

B. Bonds

1. Payment for bonds required by the contract is included in the prices bid for the various items of work in the Bidder's Blank, and therefore no separate payment will be made.

C. Permits & Licenses

1. Payment for permits and/or licenses required by the contract are included in the prices bid for the various items of work in the Bidder's Blank, and therefore no separate payment will be made.
2. Reference is hereby made to Article 1.29 (Permits) of Section 011000, Summary, of these Contract Specifications, for permitting requirements. WORK NOT PAID SEPARATELY

PART 2 PAYMENT

2.01 UNIT PRICES

1. The Bidder shall provide unit prices for the hourly rates associated with Labor; Equipment; and Material and Subcontractor Cost Markup Percentages, and Escalation (Labor and Equipment) cost markup percentages in the spaces provided in the Bid Schedule. Unit prices and cost markup percentages, as submitted with the Bid Schedule, shall be used for partial payments for any changes and/or additions to the original scope of work. Reference is made to the general Item Nos. 1, 2, 3, 4, and 5 of the Bid Schedule for the respective bid items, in "Schedule of Unit Prices".
2. Unless otherwise included in the lump sum scope of work, original invoices for Materials and Subcontractor cost shall be submitted to OWNER with the respective application for payment.

2.02 TRAFFIC CONTROL

1. Uniformed Traffic Control Police: Unless otherwise included in the lump sum scope of work, Special Duty Police for uniformed traffic control within the project's limits of construction, as required by the Providence Police Departments, will be reimbursed to the Contractor per pay period as a pass-through without markup. The Contractor will call in the details and pay the invoices to the respective cities and towns that they have utilized for the period. For reimbursement purposes, the Contractor shall forward detail voucher (slip) copies to OWNER, with a copy of the invoice for verification.

2. Flagpersons: Unless otherwise included in the lump sum scope of work, the utilization of Flagpersons for traffic control employed within the project's limits of construction, as directed by the OWNER, will be paid by the OWNER per pay application. If flagger services are subcontracted, the Contractor shall forward flagger invoices with certified payroll to OWNER for payment without markup. If the flagperson is employed by the General Contractor, flagger services shall be compensated for the employee's hourly wage without markup.

3. Temporary Construction Signage and Traffic Control Devices: Measurement for the placement and relocation of temporary construction signs, traffic cones, drums, barricades, or other traffic control devices, will not be measured separately for payment, but the costs thereof will be considered to be included with applicable items of work, as listed in the Bid Schedule, to perform the overall contract work.

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or OWNER that are not required to meet other Project requirements but may offer advantage to Contractor or OWNER.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to Engineer.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by OWNER and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific

features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of Engineers and OWNERs.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed unless otherwise indicated.

C. Substitutions for Convenience: Engineer will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Engineer.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers OWNER a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities OWNER must assume. OWNER's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by OWNER, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Engineer will issue Field Orders authorizing minor changes in the Work, not involving adjustment to the Contract Price or the Contract Time, on EJCDC Form C-942 or other form acceptable to OWNER. Also see Article 5.10 of the General Conditions.

1.4 PROPOSAL REQUESTS

A. OWNER-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Price or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Also see Article 5.10 of the General Conditions.

1. Requests For Proposal (RFP) issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
2. Within 20 days, when not otherwise specified, after receipt of RFP, submit a quotation estimating adjustments to the Contract Price and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    d. Quotation Form: Use forms acceptable to OWNER and Engineer.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Price and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to OWNER and Engineer.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Unit-Price Adjustment: See Article 5.10 of the General Conditions for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On OWNER's approval of a Change Order Request, Engineer will issue a Change Order for signatures of OWNER and Contractor on EJCDC Form C-941 or other form acceptable to OWNER.

1.7 WORK CHANGE DIRECTIVE

A. Work Change Directive: Engineer may issue a Work Change Directive on EJCDC Document C-940 or other form acceptable to OWNER. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Price or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Change Procedures" for administrative procedures for handling changes to the Contract.
2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Engineer at earliest possible date, but no later than ten days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. OWNER's name.
    c. OWNER's Project number.
    d. Name of Engineer.
    e. Engineer's Project number.
    f. Contractor's name and address.
    g. Date of submittal.

2. Arrange schedule of values consistent with format of EJCDC Document C-620 or other form acceptable to OWNER and Engineer.
3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:

    a. Related Specification Section or division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.

        1) Labor.
        2) Materials.
        3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Overhead Costs, Separate Line Items: Show cost of other major cost items that are not direct cost of actual work-in-place as separate line items.
7. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by OWNER.

B. Payment Application Times: The date for each progress payment is indicated in the OWNER/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment twenty days prior to due date for review by Engineer.

C. Application for Payment Forms: Use EJCDC Document C-620 or other form acceptable to OWNER and Engineer as form for Applications for Payment.

1. Other Application for Payment forms proposed by the Contractor may be acceptable to Engineer and OWNER. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under OWNER-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed.

1. Provide certificate of insurance, evidence of transfer of title to OWNER, and consent of surety to payment.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. OWNER reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to OWNER.

H. Maintain an updated set of drawings to be used as record drawings in accordance with Section 017839 "Project Record Documents." As a prerequisite for monthly progress payments, exhibit the updated record drawings for review by OWNER and Engineer for completeness and accuracy.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule.
4. Products list (preliminary if not final).
5. Sustainable design action plans, including preliminary project materials cost data.
6. Schedule of unit prices.
7. Submittal schedule.
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.

J. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

    a. Complete administrative actions, submittals, and Work proceeding this application, as described in Section 017700 "Closeout Procedures."

2. Include initial submittal of closeout record drawings in accordance with Section 017839 "Project Record Documents."
3. This application shall reflect Certificate(s) of Substantial Completion issued previously for OWNER occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Certification of completion of final punch list items.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Final submittal of closeout record drawings in accordance with Section 017839 "Project Record Documents."
5. Updated final statement, accounting for final changes to the Contract Sum.
6. Evidence that claims have been settled.
7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when OWNER took possession of and assumed responsibility for corresponding elements of the Work.
8. Final liquidated damages settlement statement.
9. Proof that taxes, fees, and similar obligations are paid.
10. Waivers and releases.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Web-based Project management software package.
6. Project meetings.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from OWNER, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities, list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in prominent location in CCTV truck. Keep list current at all times and inform Engineer and OWNER of any changes.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Preinstallation conferences.
6. Project closeout activities.
7. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. Coordinate the addition of trade-specific information to coordination drawings]in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    f. Indicate required installation sequences.
    g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Review: Engineer will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Engineer determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Engineer will so inform Contractor, who shall make suitable modifications and resubmit.
2. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Preparation Format: PDF, operating in Microsoft Windows operating system.
3. File Submittal Format: Submit or post coordination drawing files using PDF format.

4. Engineer will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

    a. Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    b. Digital Data Software Program: PDF.
    c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to OWNER and Engineer.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Engineer will return without response those RFIs submitted to Engineer by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. OWNER name.
3. OWNER’s Project number.
4. Name of Engineer.
5. Engineer’s Project number.
6. Date.
7. Name of Contractor.
8. RFI number, numbered sequentially.
9. RFI subject.
10. Specification Section number and title and related paragraphs, as appropriate.
11. Drawing number and detail references, as appropriate.
12. Field dimensions and conditions, as appropriate.
13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
14. Contractor's signature.
15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to OWNER and Engineer.

1. Attachments shall be electronic files in PDF format.

D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Engineer's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt by Engineer of additional information.
3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 5 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Engineer.
4. RFI description.
5. Date the RFI was submitted.
6. Date Engineer's response was received.
7. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
8. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Engineer's Digital Data Files: Digital data files of Engineer's PDF drawings will be provided by Engineer for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
2. Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in PDF.

4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to OWNER and Engineer.

B. PDF Document Preparation: Where PDFs are required to be submitted to Engineer, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify OWNER and Engineer of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including OWNER and Engineer, within three days of the meeting.

B. Preconstruction Conference: Engineer will schedule and conduct a preconstruction conference before starting construction, at a time convenient to OWNER and Engineer, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of OWNER Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Responsibilities and personnel assignments.
b. Tentative construction schedule.
c. Phasing.
d. Critical work sequencing and long lead items.
e. Designation of key personnel and their duties.
f. Lines of communications.
g. Use of web-based Project software.
h. Procedures for processing field decisions and Change Orders.
i. Procedures for RFIs.
j. Procedures for testing and inspecting.
k. Procedures for processing Applications for Payment.
l. Distribution of the Contract Documents.
m. Submittal procedures.
n. Sustainable design requirements.

o. Preparation of Record Documents.
p. Use of the premises.
q. Work restrictions.
r. Working hours.
s. OWNER's occupancy requirements.
t. Procedures for moisture and mold control.
u. Procedures for disruptions and shutdowns.
v. Construction waste management and recycling.
w. Parking availability.
x. Office, work, and storage areas.
y. Equipment deliveries and priorities.
z. First aid.
aa. Security.
bb. Progress cleaning.
cc. List of major subcontractors and suppliers.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Sustainable design requirements.
i. Review of mockups.
j. Possible conflicts.
k. Compatibility requirements.
l. Time schedules.
m. Weather limitations.
n. Manufacturer's written instructions.
o. Warranty requirements.
p. Compatibility of materials.
q. Acceptability of substrates.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.

u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
   Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to OWNER and Engineer, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of OWNER, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

   a. Preparation of Record Documents.
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   c. Procedures for completing and archiving web-based Project software site data files.
   d. Submittal of written warranties.
   e. Requirements for completing sustainable design documentation.
   f. Requirements for preparing operations and maintenance data.
   g. Requirements for delivery of material samples, attic stock, and spare parts.
   h. Requirements for demonstration and training.
   i. Preparation of Contractor's punch list.
   j. Procedures for processing Applications for Payment at Substantial Completion and for final payment including final change order.
   k. Submittal procedures.
   l. Coordination of separate contracts.
   m. OWNER's partial occupancy requirements including certificate of occupancy and closeout of permits.
   n. Installation of OWNER's furniture, fixtures, and equipment.
   o. Final cleaning.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at biweekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of OWNER and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Status of sustainable design documentation.
        5) Deliveries.
        6) Off-site fabrication.
        7) Access.
        8) Site use.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of correction of deficient items.
        12) Field observations.
        13) Status of RFIs.
        14) Status of Proposal Requests.
        15) Pending changes.
        16) Status of Change Orders.
        17) Pending claims and disputes.
        18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

5. Attendees: In addition to representatives of OWNER and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
6. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    c. Review present and future needs of each contractor present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Access.
        6) Site use.
        7) Work hours.
        8) Hazards and risks.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of RFIs.
        12) Proposal Requests.
        13) Change Orders.
        14) Pending changes.

7. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's Construction Schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Unusual event reports.

B. Related Requirements:

1. Section 014000 “Quality Requirements” for schedule of tests and inspections.
2. Section 012900 “Payment Procedures” for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either OWNER or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file.
2. PDF file.

B. Startup construction schedule.

1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, latest allowable start date, latest allowable finish date, status (where critical) and total float and free float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.

3. Total Float Report: List of activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at weekly intervals.

H. Material Location Reports: Submit at weekly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Unusual Event Reports: Submit at time of unusual event.

K. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Engineer's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing.
4. Review delivery dates for OWNER-furnished products.
5. Review schedule for work of OWNER's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and OWNER startup procedures.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.
12. Submit at this conference a preliminary network defining the planned operation during the first 60 calendar days after the Notice to Proceed.

1.6 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.

2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Program Description

1. A Critical Path Method (CPM) construction schedule shall be used to control the Work and to provide a basis for determining job progress. The construction schedule shall be prepared and maintained by the Contractor. All work shall be done in accordance with the established CPM schedule. The Contractor and all subcontractors shall cooperate fully in developing the construction schedule and in executing the work in accordance with the CPM schedule.
2. The construction schedule shall consist of a computerized CPM network (diagram of activities) presented in a time-scaled graphic (print-out) with reports, as specified herein.

B. Qualifications:

1. The Contractor shall have the capability of preparing and utilizing the specified CPM schedule or engage the services of a specialized scheduling professional to do so. Within seven days of the award of contract, provide a résumé or qualifications statement for the individual within the Contractor's organization, or the outside consultant, who is being proposed as the responsible party for development and maintenance of the CPM schedule. The résumé or qualifications statement shall demonstrate that the proposed responsible party has successfully developed and maintained CPM schedules for at least three construction projects of the same size or greater than this project. The proposed responsible party for the CPM schedule is subject to approval by the Engineer and OWNER. If the proposed responsible party for the CPM schedule is not approved by the Engineer and/or OWNER, Contractor shall resubmit a more-appropriate candidate for approval.

C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

D. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 40 days, unless specifically allowed by Engineer.

2. Activities to facilitate the Work: Indicate start and completion dates for the following as applicable:

a. Securing of approvals and permits required for performance of the Work.
b. Construction of mock-ups, prototypes and samples.
c. OWNER interfaces and furnishing of items.
d. Interfaces with Separate Contracts.
e. Regulatory agency approvals.

f. Punch list.

3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
6. Commissioning Time: Include no fewer than 15 days for commissioning.
7. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.

E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work Restrictions: Show the effect of the following items on the schedule:

   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use-of-premises restrictions.
   f. Provisions for future construction.
   g. Seasonal variations.
   h. Environmental control.

3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

   a. Subcontract awards.
   b. Submittals.
   c. Purchases.
   d. Mockups.
   e. Fabrication.
   f. Sample testing.
   g. Deliveries.
   h. Installation.
   i. Tests and inspections.
   j. Adjusting.
   k. Curing.
   l. Building flush-out.
   m. Startup and placement into final use and operation.
   n. Commissioning.

4. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Structural completion.
    b. Temporary enclosure and space conditioning.
    c. Permanent space enclosure.
    d. Completion of mechanical installation.
    e. Completion of electrical installation.
    f. Substantial Completion.

F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

1. Temporary enclosure and space conditioning.

G. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

H. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

I. Acceptability

1. Submit the CPM schedule submittals, as specified, and resubmit as needed, until they are in compliance with Contract requirements.
2. The Engineer's review of the Contractor's construction schedule submittals will only be for conformance with the Contract requirements – including but not limited to contract time and work sequences specified in the contract documents. The Engineer's review of the schedule shall not include the Contractor's means and methods of construction or safety. The Engineer's concurrence, acceptance, or approval of the Contractor's schedule submittals will not relieve the Contractor from responsibility for complying with the Contract Scope, Contract Time or any other contract requirement. Any indication of concurrence, acceptance, or approval of the Contractor's schedule will only indicate a general conformance with the Contract Requirements.

    Engineer's review of the Contractor's construction schedule submittals shall not relieve the Contractor from responsibility for any deviations from the Contract Documents unless the Contractor has in writing called Engineer's attention to such deviations at the time of submission and Engineer has given written concurrence to the specific deviations, nor shall any concurrence by the Engineer relieve Contractor from responsibility for errors and omissions in the submittals. Concurrence of the CPM Activity Network by the Engineer is

advisory only and shall not relieve the Contractor of responsibility for accomplishing the Work within the Contract completion date(s).

3. Concurrence, acceptance, or approval of the Contractor's CPM schedule by the Engineer in no way makes the Engineer an insurer of the CPM schedule's success, nor liable for time or cost overruns resulting therefrom.
4. Failure to include any element of work required for the performance of this Contract will not excuse the Contractor from completing all Work required within the Contract completion date(s), notwithstanding the review of the network by the Engineer.
5. CPM schedules that contain activities with negative float, or which extend beyond the contract completion date, will not be acceptable.
6. Except where earlier completions are specified, CPM schedules which show completion of all work prior to the contract completion date may be indicated; however, in no event shall they constitute a basis for claim for delay by the Contractor.

J. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Final Completion percentage for each activity. Activities shall not be considered to be complete until they are in fact 100 percent complete.
4. Submit a narrative report based on the CPM schedule evaluation, in a format agreed upon by the Contractor and the Engineer. The report shall include a description of the progress during the previous period in terms of completed activities, an explanation of each activity which is showing a delay, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates and an explanation of corrective action taken or proposed.

K. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

L. The contract completion time will be adjusted only for causes specified in this Contract. In the event the Contractor requests an extension of any contract completion date, the Contractor shall furnish such justification and supporting evidence as the Engineer may deem necessary to determine whether the Contractor is entitled to an extension of time under the provisions of this Contract. The Engineer will, after receipt of such justification and supporting evidence, make findings of fact and will advise the Contractor in writing thereof. If the Engineer finds that the Contractor is entitled to any extension of any contract completion date, the Engineer’s determination as to the total number of days extension shall be based upon the currently approved CPM schedule and on all data relevant to the extension. Such data shall be included in the next updating of the schedule. Actual delays in activities which, according to the CPM schedule, do not affect any contract completion date shown by the critical path in the network will not be the basis for a change therein.

M. Distribution: Distribute copies of approved schedule to Engineer OWNER, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.10 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.

10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Work Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

C. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise OWNER in advance when these events are known or predictable.

1. Submit unusual event reports directly to OWNER within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. Mass Submittals: Six or more submittals or items in one day or 15 or more submittals or items in one week.

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Engineer's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Numbering System: Utilize the following example submittal identification numbering system to identify submittals and as file names for PDF submissions:

1. First Identifier - Alphabet Character: D, S, M or I which represents Shop Drawing (including working drawings and product data), Sample, Manual (Operating & Maintenance) or Informational, respectively.
2. Second Identifier - Next 6 or 8 Digits: Applicable Specification Section Number. Do not mix submittals from different specification sections into a single submittal.
3. Third Identifier - Next Three Digits: Sequential number of each separate item or drawing submitted under each Specification Section, in chronological order submitted, starting at 001.
4. Fourth Identifier - Last Alphabet Character: A to Z, indicating the submission (or resubmission) of the same submittal, i.e., "A" = 1st submission, "B" = 2nd submission, "C" = 3rd submission, etc.

5. EXAMPLE: D-033000.13-008-B.

   a. D = Shop Drawing.
   b. 03 30 00.13 = Section; use only 6 digits for sections that do not include 8 digits.
   c. 008 = the eighth different submittal under this Section.
   d. B = the second submission (first resubmission) of that particular shop drawing.

B. Submittal Information: Include the following information in each submittal:

1. Project title and number.
2. The date of submission.
3. Name of Engineer.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

C. Options: Identify options requiring selection by Engineer.

D. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Engineer on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

E. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

F. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package and transmit to Engineer by sending via email. Include PDF transmittal form. Include information in email subject line as requested by

Engineer.

a. Engineer will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

2. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal (and 45 days for multi-discipline reviews). Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, OWNER, or other parties is indicated, allow 15 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Engineer and to Engineer's consultants, allow 30 days for review of each submittal. Submittal will be returned to Engineer before being returned to Contractor.

a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of

revision.

3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
4. Repetitive Reviews: Shop drawings, O&M manuals, and other submittals will be reviewed no more than twice at the OWNER's expense. All subsequent reviews will be performed at the Contractor's expense. Reimburse the OWNER for all costs invoiced by Engineer for the third and subsequent reviews.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Engineer's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

   a. Project name and submittal number.
   b. Generic description of Sample.
   c. Product name and name of manufacturer.
   d. Sample source.
   e. Number and title of applicable Specification Section.
   f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
4. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as OWNER's property, are the property of Contractor.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing

color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and OWNERs, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Insert definition of Contractor certificates here if required by individual Specification Sections. See the Evaluations.
3. Contractor’s Certification: Each shop drawing, working drawing, product data, and sample shall have affixed to it the following Certification Statement:

a. "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements. "

4. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying

that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

5. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
6. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
7. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
8. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 PROPOSED PRODUCT LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.10 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Contractor Responsible for:

1. Determination and verification of materials including manufacturer’s catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.
9. Other requirements enumerated in Contract Documents.

C. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.

1.11 ENGINEER'S REVIEW

A. Do not make mass submittals to Engineer. If mass submittals are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review mass submittals based on priority determined by Engineer after consultation with OWNER and Contractor.

B. Action Submittals: Engineer will review each submittal, indicate corrections or revisions required.

1. PDF Submittals: Engineer will indicate, via markup on each submittal, the appropriate action.

a. Insert description of each action indicated on Engineer's stamp.

2. Submittals by Web-Based Project Management Software: Engineer will indicate, on Project management software website, the appropriate action.

a. Actions taken by indication on Project management software website have the following meanings:

1) Insert description of each action indicated on Engineer's stamp.

C. Informational Submittals: Engineer will review each submittal and will not return it or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.

E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

F. Engineer will return without review submittals received from sources other than Contractor.

G. Submittals not required by the Contract Documents will be returned by Engineer without action.

H. Shop drawings will be returned to the Contractor with one of the following codes.

1. "APPROVED" - This code is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
2. "APPROVED AS NOTED" - This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
3. "APPROVED AS NOTED/RESUBMIT" - This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. The resubmittal is to

address all comments, omissions and non-conforming items that were noted. An additional box is checked to indicate whether the resubmission is for the complete package, or for parts of the package. If no box is checked, a complete resubmittal shall be provided. Review code may designate if a partial or full submittal is required. If full submittal is required, a complete resubmittal package addressing all comments shall be provided. If a partial submittal is designated, resubmittal shall only include information pertaining to those items noted in review comments requiring clarification and any portions of submittal impacted as a result of the response. Resubmittal is to be received by the Engineer within 30 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

4. "REJECTED" - This code is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.
5. "RECEIPT ACKNOWLEDGED (Not subject to Engineer's Approval)" - This code is assigned to acknowledge receipt of a submittal that is not subject to the Engineer's approval. This code is generally used with submittals involving the Contractor's means and methods of construction work plans, and health and safety plans.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 013300

SECTION 013545 - ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish all labor, materials and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.

C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area. Specific requirements for erosion and sedimentation controls are specified in Section 312500 “Erosion and Sedimentation Controls.”

D. This Section is intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor’s responsibility to determine the specific construction techniques to meet these guidelines.

E. All phases of sedimentation and erosion control shall comply with and be subject to the approval of the Engineer and OWNER.

F. Section includes:

1. Prohibited Activities.
2. Erosion control.
3. Protection of streams and surface waters.
4. Protection of land resources.
5. Protection of air quality.
6. Noise control.

7. Maintenance of Pollution Control Facilities During Construction.

1.3 QUALITY CONTROL

A. Comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

B. Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the OWNER may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

1.4 PREINSTALLATION MEETINGS

A. Prior to commencement of the work, meet with the Engineer and OWNER to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.

1.5 IMPLEMENTATION

A. Remove temporary environmental control features, when approved by the Engineer and incorporate permanent control features into the project at the earliest practicable time.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROHIBITED ACTIVITIES

A. Do not use procedures, activities, or operations that may adversely impact the natural environment or the public health and safety. Prohibited construction procedures, activities, or operations include but are not limited to:

1. Dumping or disposal of spoil materials, discharging of solid waste deleterious to any stream corridors, any wetlands, any surface waters, or on any public or private property not specified for said purpose.
2. Disposal of debris in any stream corridors, any wetlands, any surface water, or at

unspecified locations.

3. Storing construction equipment and vehicles and/or stockpiling construction materials at locations not previously specified and approved by the OWNER for said purposes.
4. Dumping, disposing, or stockpiling of any material at any location within the City of Providence without approval.

3.2 EROSION CONTROL

A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Offsite surface water shall be diverted around the site, to a downstream channel ahead of siltation barriers. Flow of surface water into excavated areas shall be prevented. Ditches around construction area shall also be used to carry away water resulting from dewatering of excavated areas. All erosion control measures shall be in place in an area prior to construction activity in that area. Specific requirements for erosion and sedimentation controls are specified in Section 312500 "Erosion and Sedimentation Controls." At the completion of the work, ditches shall be backfilled, and the ground surface restored to original condition.

B. Clearing of vegetation shall be limited to what is necessary for equipment to access the manholes. Roots shall not be removed.

3.3 PROTECTION OF STREAMS AND SURFACE WATERS

A. Temporary stockpiling of soil materials shall be upgradient of the hay bale barrier to prevent sediments from being transported to adjacent wetland resource areas.

B. Take all precautions to prevent, or reduce to a minimum, any damage to any stream or surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Divert such waters through a settling basin or filter before being directed into streams or surface waters.

C. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.

D. Take all preventative measures to avoid spillage of petroleum products and other pollutants. Maintenance and refueling of vehicles will take place outside of the 100-foot buffer zone to any resource areas. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Rhode Island Department of Environmental Management. A supply of “Speedy Dry”, oil absorbent pads, or an approved equivalent, shall be maintained with the construction equipment at all times which shall be used to contain any accidental release of oil or other petroleum products during the field work. Submit two copies of approved contingency plans to the Engineer.

3.4 PROTECTION OF LAND RESOURCES

A. Restore land resources within the project boundaries and outside the limits of permanent work to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas within the scope of work or as directed by the OWNER.

B. Outside of areas requiring earthwork for the construction of the new sewer lines and manholes, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.

C. Before beginning operations near them, protect trees that may possibly be defaced, bruised, injured, or otherwise damaged by the construction equipment, dumping or other operations, by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly.

D. Trees or other landscape features scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to their original condition. The Engineer will decide the method of restoration to be used and whether damaged trees shall be treated and healed or removed and disposed of.

1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.
2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.

E. The locations of the Contractor's storage and other construction buildings required temporarily in the performance of the work, shall be cleared portions of the job site or areas to be cleared as required and approved by the Engineer and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.

F. If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he shall submit the following for approval at least ten days prior to scheduled start of such temporary work.

1. A layout of all temporary roads, excavations, embankments and drainage to be constructed within the work area.
2. Details of temporary road construction.
3. Drawings and cross sections of proposed embankments and their foundations, including a

description of proposed materials.

4. A landscaping drawing showing the proposed restoration of the area. Indicate the proposed removal of any trees and shrubs outside the limits of existing clearing area. Indicate locations of guard posts or barriers required to control vehicular traffic and protect trees and shrubs to be maintained undamaged. The Drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the Contractor's approved drawings shall be made only with the written approval of the Engineer. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.

G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction as directed by the Engineer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. This work is only anticipated to impact roadways, the disturbed areas will be prepared as described in Section 321216 “Asphalt Paving” and Section 321723 “Pavement Markings.”

H. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner.

3.5 PROTECTION OF AIR QUALITY

A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.

B. Dust Control - Maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded and which would cause a hazard or nuisance to others.

C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the Engineer.

D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor shall have sufficient competent equipment on the job to accomplish this. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Engineer.

3.6 NOISE CONTROL

A. Make every effort to minimize noises caused by the construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations.

3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. Maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

END OF SECTION 013545

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Engineer, OWNER, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" shall have the same meaning as the term "testing agency."

H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Engineer.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Engineer regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Engineer for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For OWNER's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Engineer. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate OWNER's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
3. OWNER-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include Work Engineer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspection.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329**,** and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect, demonstrate, repair and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods. Contractor responsibilities include the following:

1. Provide test specimens representative of proposed products and construction.
2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
4. When testing is complete, remove test specimens; do not reuse products on Project.
5. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

1.10 QUALITY CONTROL

A. OWNER Responsibilities: Where quality-control services are indicated as OWNER's responsibility, OWNER will engage a qualified testing agency to perform these services.

1. OWNER will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to OWNER are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.
    a. Contractor shall not employ same entity engaged by OWNER, unless agreed to in writing by OWNER.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor’s Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payments.

1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and OWNER-retained services, commissioning activities, and other Project-required services paid for by other entities.
2. Distribution: Distribute schedule to OWNER, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: OWNER will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of OWNER, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's and authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015526 - TRAFFIC CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating traffic operations on Project including, but not limited to, the following:

1. Traffic control and protective devices, as required to expedite vehicular traffic flow during construction
2. Providing access to all buildings including business and parking areas at all times.
3. Maintaining a minimum of one 11-ft lane of traffic, in one direction, at all times.
4. Providing police details at certain times in order to maintain safe traffic control within the project area. This requirement will be determined by the OWNER or Engineer.

1.3 REQUIREMENTS

A. All traffic control shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), and these specifications. Where reference is made to the aforementioned publication, the revision in effect at the time of bid opening shall apply. Also see Article 6.23 of the Special Conditions.

B. Furnish, install, operate and maintain equipment, services and personnel, with the traffic control and protective devices, as required to expedite vehicular traffic flow during construction.

C. Review the Standard Traffic Management Plans provided with this Contract for suitability to actual work zone locations required to complete the work. For locations and conditions not covered by the provided standard setups, submit to the Engineer a traffic plan detailing all temporary changes in traffic control equipment, street or road closures, detours, etc. for all work under this contract. No work shall commence until this plan has been reviewed and approved by the Providence Police Department. After approval, copies of this plan shall be submitted to the OWNER, Engineer, Police Department, Fire Departments, and School Departments. The Contractor shall make every effort to adhere to this plan. When necessary, update this plan and forward these changes to the Engineer for approval. The OWNER reserves the right to modify the plan through the course of the Contract.

D. Remove temporary equipment and facilities when no longer required and restore grounds to original or to specified conditions.

E. Notify all property OWNERs at least 48 hours in advance of any work that will interfere with access to their residence or place of business. Access must be provided to local residences at all times during completion of the contract.

F. No road shall be closed to traffic without the prior consent of the Engineer, the agency responsible for the road, and the City of Providence Police Department.

G. Traffic control, including but not restricted to signing and devices, shall be provided for all openings in roads by the Contractor in accordance with State standards.

1.4 MAINTENANCE OF TRAFFIC

A. All traffic, including access to private driveways, shall be maintained at all times during the progress of work. Equipment, materials, and bypass piping shall not block access to driveways or prevent travel on any public or private roads. Also see Article 6.73 of the Special Conditions.

B. Provide all necessary barricades and signs as required to divert the flow of traffic. Expedite operations while traffic is detoured. Periods when traffic is being detoured will be strictly controlled by the OWNER.

C. Where possible, allow for the maintenance of a minimum of one 11-ft lane of traffic, in one direction, at all times.

D. Police details will be required in order to maintain safe traffic control within the project area. This requirement will be determined by the OWNER or Engineer. Policing is discussed in Article
1.10. Also see Article 6.78 of the Special Conditions.

E. No detour shall be allowed without prior approval of the Engineer and the OWNER. A detailed Traffic Control Detour Plan shall be submitted by the Contractor to the Engineer showing schedule, signage and control for the proposed detour. Said plan(s) shall be submitted at least 10 working days prior to the proposed detour taking effect.

1.5 MINIMUM REQUIREMENTS OF THE TRAFFIC PLAN

A. Traffic plan shall provide for access to all buildings including businesses and parking areas at all times except as allowed herein.

B. Plan shall illustrate traffic detours as provided by the Police Department, location, type and size of signage.

C. Plan shall include schedule for traffic control in relation to construction.

1.6 ACTION SUBMITTALS

A. Submit traffic control phased plans showing the setup, number and with of open lanes and schedule for approval by the Engineer, prior to any work commencing within the right of way.

1.7 TRAFFIC SIGNALS AND SIGNS

A. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under the Contractor's control or affected by the Contractor's operations. Also see Article 6.23 of the Special Conditions.

B. Traffic signs shall be compliant with the Manual of Uniform Traffic Control Devices, clean and not altered in any way with duct tape, marker, etc.

C. Provide traffic control and directional signs, mounted on barricades or standard posts at the following locations, as directed by the Engineer:

1. Each change of direction of a roadway and each crossroads.
2. Detours.
3. Parking areas.
4. For businesses within detour routes.
5. As specified on the Drawings and approved Traffic Plans.

C. Existing permanent traffic control signing and devices, including guardrails, shall not be removed unless called for on the Drawings, scope of work, or without the prior consent of the OWNER and the Engineer.

D. After completion of the project, remove all construction signing and support systems and patch the disturbed area to match existing as closely as possible and to the satisfaction of the Engineer.

E. Detours around construction will be subjected to the approval of the OWNER and the Engineer. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the OWNER.

F. Provide signs promoting access to impacted businesses during construction.

1.8 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to preclude interference with public traffic or parking, school or residential parking, and access by emergency vehicles.

B. Monitor parking of construction personnel's private vehicles, maintain free vehicular access to and through parking areas and prohibit parking on or adjacent to access roads or in non-designated areas.

1.9 HAUL ROUTES

A. Contractor shall consult with governing authorities to establish public thoroughfares, which will be used as haul routes and site access.

1.10 POLICING

A. When, in the opinion of the OWNER, Engineer, or the City of Providence Police Department public safety or convenience requires the services of police, the Engineer may direct the Contractor to provide manpower to direct traffic within the location of work under this Contract.

B. When so directed, make all arrangements in obtaining the necessary policing manpower.

C. The intent is to ensure public safety by police direction of traffic. Police are not to serve as watchmen to protect the Contractor's equipment and materials, or to warn pedestrians of hazards.

D. Nothing contained herein shall be construed as relieving the Contractor of any of his/her responsibilities for protection of persons and property under the terms of the Contract.

E. Cancellation of any scheduled police detail due to inclement weather or any other reason shall be the responsibility of the Contractor and shall be made no less than 1 hour prior to the scheduled start time. Contractor shall be responsible for payment of police details not cancelled or cancelled without proper 1 hour notice, with no reimbursement by the OWNER.

F. All payments to police under this Contract shall be in accordance with Article 6.78 of the Special Conditions.

G. Police details shall be paid for by the OWNER. Contractor must submit Police detail slips with a cover letter summarizing the days and cost of the details on a weekly basis.

H. No work is to be done on streets where Police Details are required unless the Detail Officers are on site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 015526

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 011000 “Summary” for Contractor requirements related to OWNER-furnished products.
2. Section 012500 "Substitution Procedures" for requests for substitutions.
3. Section 017700 “Closeout Procedures” for submitting warranties.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycle contract materials are considered new products, unless indicated otherwise.
3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 “Comparable Products” Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. **Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.**

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Resolution of Compatibility Disputes between Multiple Contractors:

a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

1.5 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection for wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by OWNER's construction forces. Coordinate location with OWNER.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the OWNER or endorsed by manufacturer to OWNER.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for OWNER and issued in the name of the OWNER or endorsed by manufacturer to OWNER.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. OWNER reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.

5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by Engineer through Construction Manager in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Engineer, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product that complies with requirements.

    a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
    b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer that complies with requirements.

   a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
   b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.

7. Basis-of-Design Product: Where Specifications name a product or refer to a product indicated on Drawings (or scope of work), and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

   a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require the phrase "match Engineer's sample," provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following

conditions are not satisfied, Engineer may return requests without action, except to record noncompliance the following requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects, with project names and addresses and names and addresses of Engineers and OWNERs, if requested.
5. Samples, if requested.

B. Engineer's Action on Comparable Products Submittal: If necessary, Engineer will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."

1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
2. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements, Two-Step Process: Approval by the Engineer of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

D. Submittal Requirements, Single-Step Process: When acceptable to Engineer, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Engineer of Contractor' request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 016000

CITY OF PROVIDENCE,
ON-CALL SEWER AND DRAINAGE REPAIRS
(BLANKET CONTRACT 2023-2025)

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Protection of installed construction.
6. Miscellaneous Work and Clean up

B. Related Requirements:

1. Section 011000 "Summary" for coordination of, and limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of OWNER-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to submitting cutting and patching plan, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Engineer of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Certificates: Submit certificate signed by professional engineer, certifying that location and elevation of improvements comply with requirements.

C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.6 QUALITY ASSURANCE

A. Professional Engineer Qualifications: Refer to Section 014000 “Quality Requirements.”

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements, whose structural function is not known, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting

and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

   a. Plumbing piping systems.
   b. Conveying systems.

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work, including Specification Section number and paragraphs, and Drawing sheet number and detail, where applicable.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction. Also see Article 6.71 of the General Conditions.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings if provided.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Engineer promptly.

B. Engage a professional engineer experienced in laying out the Work, using the following accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

A. Identification: OWNER will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points

promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Engage a professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure satisfactory results as judged by Engineer. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items onsite and placement in permanent locations.

F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Engineer. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Repair Work previously completed and subsequently damaged during construction period Repair to like-new condition.

C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

D. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 MISCELLANEOUS WORK AND CLEAN UP

A. Do all incidental work not otherwise specified, but obviously necessary to the proper completion of the Contract as required.

B. The Contractor shall be responsible for all damage to private property due to his/her operations. Contractor shall protect from injury all walls, fences, cultivated shrubbery and vegetables,

pavement, underground facilities, such as water pipe, or other utilities which may be encountered along the route. If removal and replacement are required, it shall be done in a workmanlike manner so that replacement is equivalent to that which existed prior to construction.

C. Existing lawn and sod surfaces damaged by construction shall be replaced.

D. Where clearing is required for access to the work, Contractor shall clear only the minimum area required for access and equipment to perform the work. Clearing shall be performed without damage to adjacent property outside of the work area, and Contractor shall submit proposed clearing plan to OWNER and Engineer prior to performing the work

E. Existing public and private driveways disturbed by the construction shall be replaced. Paved drives shall be repaved to the limits and thicknesses existing prior to construction. Gravel drives shall be replaced and regraded.

F. Existing public and private sidewalks disturbed by the construction shall be replaced with sidewalks of equal quality and dimension at the Contractor's expense.

G. Remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition.

H. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 def F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

I. Site: Maintain Project site free of waste materials and debris.

J. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

K. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

L. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

M. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

N. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Also see Article 6.29 of the Special Conditions.

O. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

P. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Q. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Requirements:

1. Section 012900 “Payment Procedures” for requirements for Applications for Payment for Substantial Completion and Final Completion.
2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Engineer’s use prior to Engineer’s inspection, to determine if the Work is substantially complete.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.5 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.7 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting OWNER unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Engineer's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit sustainable design submittals not previously submitted.
7. Submit changeover information related to OWNER's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise OWNER of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to OWNER. Advise OWNER's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Advise OWNER of changeover in utility services.

6. Participate with OWNER in conducting inspection and walkthrough with local emergency responders.
7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Complete final cleaning requirements.
9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.8 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit Final Completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.9 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order,
2. Include the following information at the top of each page:

a. Project name.
b. Date.
c. Name of Engineer.
d. Name of Contractor.
e. Page number.

3. Submit list of incomplete items in the following format:

a. MS Excel Electronic File. Engineer will return annotated file.
b. PDF Electronic File. Engineer will return annotated file.
c. Web-Based Project Management Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.10 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit OWNER's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by OWNER during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit by email to Engineer.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Clean flooring, removing debris, dirt, and staining: clean according to manufacturer’s recommendations.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 011000 "Summary", and in Article 6.29 of the Special Conditions.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 017300 “Execution” before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

CITY OF PROVIDENCE,
ON-CALL SEWER AND DRAINAGE REPAIRS
(BLANKET CONTRACT 2023-2025)

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 012900 “Payment Procedures” for maintaining and exhibiting project record documents as a prerequisite for progress payments.
2. Section 017300 "Execution" for final property survey.
3. Section 017700 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.
2. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one set(s) of file prints.
2) Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit PDF electronic files of scanned Record Prints and three set(s) of file prints.

c. Final Submittal:

1) Submit Record Digital Data Files and three set(s) of Record Digital Data File plots.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report weekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

F. Pre/Post Construction Videos: Submit CCTV inspection of all sanitary sewers within the project area prior to any work completed. Additionally, submit post construction videos following all spot replacements of sewer, CIPP lining, manhole installation, and other project work. Submit two portable hard drives of CCTV videos in conformance with other project Specification sections

G. Testing: Submit all testing results as described in other specification sections.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Work Change Directive.
    k. Changes made following Engineer's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer for resolution.
4. Engineer will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 013100 "Project Management and Coordination" for requirements related to use of Engineer's digital data files.
    b. Engineer will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Engineer.
    e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

B. Format: Submit Record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

C. Format: Submit Record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours. As a prerequisite for monthly progress payments, exhibit the updated record documents for review by OWNER and Engineer for accuracy and completeness.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 017839

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 036000 “Grouting” for grouting.
2. Section 312000 "Earthwork" for drainage fill.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials change, source of cement or aggregate change or test results do not meet specification requirements, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, spacing, lengths, material, grade, bar schedules, bent bar diagrams, bar arrangement, splices and laps, tie spacing, hoop spacing, and supports for concrete reinforcement. Reference bars to be the same identification marks shown on the bar bending details.

D. Construction Joint Layout: As directed by Engineer.

E. Material Certificates: For each of the following:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Curing compounds.
6. Bonding agents.
7. Vapor retarders.
8. Repair materials.

F. Material Test Reports: For the following, from a qualified testing agency:

1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
2. Mill Test Reports:

    a. Cementitious materials.
    b. Steel Reinforcing.

1.5 INFORMATIONAL SUBMITTALS

A. PE Certification form for the design of formwork.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Provide reinforcement free from mill scale, rust, mud, dirt, grease, oil, ice, or other foreign matter that will reduce or destroy bond. Deliver, store, and handle steel reinforcement to prevent bending and damage. Store reinforcement off the ground, protect from moisture, and keep out of standing water, and free from rust, mud, dirt, grease, oil, ice, or other contaminants and deleterious films that will reduce or destroy bond.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 318.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. Structural 1, B-B or better; mill oiled, and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 1 by 1 inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to below grade walls.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

B. Tie wires for reinforcement: 16 gauge or heavier black annealed wire to tie uncoated reinforcing. Use zinc coated wire to tie galvanized reinforcing. Use epoxy coated wire to tie epoxy coated reinforcing.

2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type II.

2. Fly Ash: ASTM C 618, Class F.
3. Slag Cement: ASTM C 989/C 989M, Grade 120.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: ASTM C33 Size Number 57 nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

F. Water: ASTM C 94/C 94M and potable.

2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1-D, Class B, dissipating.

2.8 RELATED MATERIALS

A. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types II, nonload bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Slag Cement: 45 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, for placement and workability.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.45.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Chamfer exterior corners and edges of permanently exposed concrete.

H. Form openings, chases, offsets, sinkages, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, ice, snow and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for walls, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.4 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose mill scale, rust, mud, dirt, grease, oil, ice, and other foreign materials that reduce or destroy the bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Splicing:

1. If not indicated on Drawings, locate reinforcement splices at point of minimum stress.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.
2. Locate horizontal joints at the top of footings.
3. Space vertical joints in walls as indicated.
4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces. Intentionally roughen concrete surface and remove laitance prior to applying epoxy-bonding adhesive.
5. At construction joints and at concrete joints indicated to be "roughened", uniformly roughen the surface of concrete to a full amplitude (distance between high and low points and side to side) of 1/4 inch with chipping tools to expose a fresh face.

Thoroughly clean joint surfaces of loose or weakened materials by waterblasting or sandblasting and prepare for bonding. At least two hours before and again shortly before the new concrete is deposited, saturate joints with water. After glistening water disappears, coat joints with neat cement slurry mixed to consistency of very heavy paste. Coat surfaces to a depth of at least 1/8 inch thick, scrubbed-in by means of stiff bristle brushes. Deposit new concrete before the neat cement dries.

6. Do not use keyways in construction joints unless specifically shown on the Drawings, scope of work, or approved by the OWNER/Engineer.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid “cold” joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

3.8 FINISHING FORMED SURFACES

A. Finish concrete surfaces according to ACI 318.

B. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot- weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit sawcut at the perimeter of the area to a depth of 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

E. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.12 FIELD QUALITY CONTROL

A. OWNER will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Notify the OWNER when the reinforcing is complete and ready for inspection, at least six working hours prior to the proposed concrete placement. Do not cover reinforcing steel with concrete until the installation of the reinforcement, including the size, spacing and position of the reinforcement has been inspected by the OWNER’s inspection agency and the OWNER’s inspection agency release to proceed with the concreting has been obtained. Keep forms open until the OWNER’s inspection agency has completed inspection of the reinforcement.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements by the OWNER’s testing agency:

1. Testing Frequency: One composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

   a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests will be performed when concrete consistency appears to change.

3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000

SECTION 036000 - GROUTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonshrink cementitious grout.

B. Related Requirements:

1. Section 033000 – "Cast-in-Place Concrete".

1.3 ACTION SUBMITTALS

A. Section 013300 – "Submittal Procedures": Requirements for submittals.

B. Product Data: Submit manufacturer information regarding grout and surface preparation, mixing and installation.

1. Commercially manufactured nonshrink cementitious grout. Include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, and conformity to the specified ASTM standards.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

B. Manufacturer Instructions: Submit instructions for mixing, handling, surface preparation, and placing nonshrink grouts.

C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

D. Qualifications Statement:

1. Submit qualifications for manufacturer.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years' experience in production and use of provided grouts.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 – "Product Requirements": Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions. Limit total storage time from date of manufacture to date of installation to six months or the manufacturer's recommended storage time, whichever is less.

D. Remove immediately from the site material which becomes damp, contains lumps, or is hardened and replace with acceptable material.

E. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location.
2. Provide additional protection according to manufacturer instructions.

1.7 AMBIENT CONDITIONS

A. Comply with manufacturer's requirements for ambient condition control facilities for product storage and installation.

B. Maximum Conditions: Do not perform grouting if temperatures exceed 90 degrees F.

C. Minimum Conditions: Do not perform grouting if the minimum temperature of base plates, supporting concrete and grout are less than 40 degrees F. Maintain minimum temperature of 40 degrees F before, during, and after grouting, until grout has set.

PART 2 - PRODUCTS

2.1 NONSHRINK CEMENTITIOUS GROUT

A. Description:

1. Pre-mixed and ready-for-use formulation requiring only addition of water.
2. Nonshrink, non-corrosive, nonmetallic, non-gas forming, not containing expansive cement and no chlorides.
3. No shrinkage when tested in conformity with ASTM C 827/C 827M.

B. Performance and Design Criteria:

1. Certified to maintain initial placement volume or expand after set, and to meet following minimum properties when tested according to ASTM C 1107/C 1107M for Grades B, C, D and CRD-C621 nonshrink grout:

    a. Setting Time:

        1) Initial: Approximately two hours.
        2) Final: Approximately three hours.
        3) Comply with ASTM C 191.

    b. Maximum Expansion: 0.10 to 0.40 percent.
    c. Minimum Compressive Strength:

        1) One-Day: 4,000 psi.
        2) Seven-Day: 7,000 psi.
        3) 28-Day: 10,000 to 10,800 psi.
        4) Comply with CRD-C621.

2.2 FORMWORK

A. As specified in this Section and in Section 033000 “Cast-in-Place Concrete”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017300 – “Execution”: Requirements for installation examination.

B. Verify areas to receive grout.

3.2 PREPARATION

A. Section 017300 – “Execution”: Requirements for installation preparation.

B. Place grout where indicated or specified over existing concrete and cured concrete which has attained its specified design strength unless otherwise approved by the Engineer.

C. Remove defective concrete, ice, laitance, dirt, oil, grease, form release agents, paints and other foreign material from concrete surfaces, which may affect the bond or performance of the grout by brushing, hammering, chipping, sand blasting or other similar dry mechanical means until sound and clean concrete surface is achieved. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.

    1. Air compressors used to clean surfaces in contact with grout shall be the oil-less type or equipped with an oil trap in the airline to prevent oil from being blown onto the surface.

D. Roughen concrete lightly, but not to interfere with placement of grout.

E. Remove foreign materials from metal surfaces in contact with grout.

F. Align, level, and maintain final positioning of components to be grouted.

G. Wash concrete surfaces clean and then keep moist for at least 24 hours prior to the placement of nonshrink cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, or flooding the surface or other method acceptable to the Engineer. Upon completion of the 24-hour period, remove visible water from the surface prior to grouting.

H. Support equipment during alignment and installation of grout by shims, wedges, blocks or other approved means. Prevent bond of shims, wedges and blocking devices by bond breaking coatings and remove after grouting unless otherwise approved by the Engineer. Grout voids created by the removal of shims, wedges, and blocks.

3.3 INSTALLATION - GENERAL

A. Formwork:

1. Construct leakproof forms anchored and shored to withstand grout pressures.
2. Install formwork with clearances to permit proper placement of grout.
3. As specified in Section 033000 “Cast-in-Place Concrete”.

B. Curing:

1. Prevent rapid loss of water from grout during first 48 hours by using wet burlap bags, soaker hoses or ponding.
2. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury.
3. After grout has attained its initial set, keep damp for minimum three days.

C. Reflect all existing underlying construction joints through the grout.

3.4 SCHEDULE

A. Use particular types of grout as follows:

1. General Purpose Nonshrink Cementitious Grout (CRD-C621 Grade D): Use at locations where nonshrink grout is indicated, except for base plates greater in area than 3-feet wide by 3-feet long.

END OF SECTION 036000

SECTION 310515 - SOILS AND AGGREGATES FOR EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Soils: Soil materials and topsoil materials.
2. Aggregates: Coarse aggregate materials and fine aggregate materials.

B. Related Sections:

1. Section 312000 “Earthwork.”
2. Section 312333 “Trenching and Backfilling”
3. Section 312500 “Erosion and Sedimentation Control.”
4. Section 321216 “Asphalt Paving.”
5. Section 329119 “Landscape Grading.”
6. Section 330130.72 “Cured-In-Place Pipe Lining.”
7. Section 330130.80 “Point Repairs to Sanitary Sewer Lines.”
8. Section 330513 “Manholes and Structures.”
9. Section 333100 “Sanitary Utility Sewerage Piping.”

1.2 ACTION SUBMITTALS

A. Section 013300 “Submittal Procedures” for requirements of submittals.

B. Samples - Soils: Submit in 5-gallon air-tight containers, 50 lbs. sample of each type of subsoil fill to testing laboratory.

C. Samples - Aggregates: Submit, in 5-gallon air-tight containers, 50 lbs. sample of each type of aggregate fill to ENGINEER at least 15 days prior to placement of backfill or fill.

D. Quality Control Testing: Submit conformance testing performed by a certified independent laboratory engaged by Contractor for all fill materials. Verify maximum density, gradation, Atterberg limits, sand equivalent, and other applicable criteria at least 72 hours prior to importing or placing any fill. Perform additional conformance testing at a minimum frequency of 1 per every 2000 cubic yards or change in material.

1.3 INFORMATIONAL SUBMITTALS

A. Materials Source: Submit name and location of imported materials suppliers.

B. Source's Certificate: Certify materials meet or exceed specified requirements.

C. Material Test Reports: For each on-site and borrow soil and aggregate material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 1557.
3. Test Reports: Submit any test reports required by this Section to the Engineer.

1.4 QUALITY ASSURANCE

A. Furnish each subsoil and topsoil material from single source throughout the Work, unless an alternate source is approved by the Engineer.

B. Furnish each coarse and fine aggregate material from single source throughout the Work, unless an alternate source is approved by the Engineer.

C. Perform Work according to Rhode Island Department of Transportation (RIDOT) Bluebook standards.

D. Quality Control and Quality Assurance consists of laboratory conformance testing of samples supplied from each coarse and fine aggregate source and quality control during installation.

1. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

E. Maintain one copy of each standard affecting Work of this Section on Site.

1.5 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Contractor shall apply for Traffic Engineering Permits to occupy the street or sidewalk in each occurrence. The Contractor shall also obtain a sewer and road opening permit for any excavated repairs at the Department of Public Works. Fees will be waived.

2. Provide alternate routes around closed or obstructed traffic ways if required by OWNER or authorities having jurisdiction.

B. Tree and Plant Protection Zones: Comply with requirements and measures specified in Section 011000 "Summary."

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Common Fill: Approved on site excavated material or imported fill material that is composed of durable soil free of debris, organic matter, or other deleterious materials, with no stones larger than 6 inches in largest diameter, and a maximum of 75 percent passing the No. 200 sieve, and a maximum dry density of at least 85 pounds per cubic foot (pcf) as determined by ASTM D698. Provide fill with no granite blocks, broken concrete, masonry rubble, or other similar materials and with physical properties such that it can be readily spread and compacted during filling.

B. Select Common Fill: As specified above for common fill, except containing no stones larger than 2 inches in largest diameter.

C. Structural Fill: Consist of mineral soil free of organic material, loam, debris, frozen soil or other deleterious material which may be compressible, or which cannot be properly compacted, with the following gradation:

Sieve Size	Percent Finer by Weight
3-in	100
No. 4	20 to 70
No. 40	5 to 35
No. 200	0 to 10

D. Provide structural fill with a maximum liquid limit of 50 percent, maximum plasticity index of 10 percent, and a maximum dry density of at least 95 pcf as determined by ASTM D1557.

2.2 TOPSOIL MATERIALS

A. Topsoil: Conforming to RIDOT Bluebook standards.

2.3 COARSE AGGREGATE MATERIALS

A. Coarse Aggregate - Crushed Stone: Natural stone; washed, free of clay, shale, organic matter; conforming to RIDOT Bluebook standards.

1. Coarse Aggregate Designation: No. 57.

B. Coarse Aggregate - Screened Gravel: Natural stone; washed, hard, durable, rounded, or sub-angular particles of proper size and gradation, and shall be free from sand, loam, clay, excess fines, and other deleterious materials; to the following limits:

1. Percent Passing per Sieve Size:

a. 5/8- inch100 percent.
b. 1/2-inch: 40 to 100 percent.
c. 3/8-inch: 15 to 45 percent.

d. No. 10: 0 to 5 percent.

C. Coarse Aggregate - Pea Gravel (Type A5): Natural stone; free of clay, shale, organic matter; graded according to ASTM C 136; to the following limits:

1. Percent Passing per Sieve Size:

a. 1/2- inch100 percent.
b. 3/8-inch: 90 percent.
c. No. 4: 30 percent.
d. No. 8: 10 percent.
e. No. 16: 5 percent.

2.4 FINE AGGREGATE MATERIALS

A. Fine Aggregate - Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded according to ASTM C 33; within the following limits:

1. Percent Passing per Sieve Size:

a. No. 495 to 100.
b. No. 880 to 100.
c. No. 1650 to 85.
d. No. 3025 to 60.
e. No. 5010 to 30.
f. No. 1002 to 10.

2.5 SOURCE QUALITY CONTROL

A. Section 014000 – “Quality Requirements”: Testing and inspection services. Submit test result reports to the Engineer.

B. Subsoil Material - Testing and Analysis: Perform in accordance with ASTM D 1557.

C. Topsoil Material - Testing and Analysis: Perform in accordance with ASTM D 1557.

D. Coarse Aggregate Material - Testing and Analysis: Perform according to ASTM D 1557.

E. Fine Aggregate Material - Testing and Analysis: Perform according to ASTM D 1557.

F. When tests indicate materials do not meet specified requirements, change material and retest.

G. Furnish materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.1 EXCAVATION - SOILS

A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in

designated areas.

B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.

C. Remove excess excavated materials subsoil and topsoil not intended for reuse, from site and dispose of in accordance with Article 6.81 of the City of Providence Special Conditions.

D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site and dispose of in accordance with Article 6.81 of the City of Providence Special Conditions.

3.2 EXCAVATION - AGGREGATES

A. Coordinate excavation of aggregate materials from on-site locations designated by Engineer as specified in Section 312000 “Earthwork.”

B. Stockpile excavated material meeting requirements for coarse aggregate materials and fine aggregate materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for materials from site and dispose of in accordance with Article 6.81 of the City of Providence Special Conditions.

3.3 STOCKPILING

A. Stockpile materials on site at locations designated by Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different soil and aggregate materials with dividers or stockpile individually to prevent mixing. Prevent intermixing of soil types or contamination.

D. Stockpile topsoil 8 feet high maximum.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

F. Stockpile hazardous materials on impervious liner and cover to prevent erosion and leaching, until disposed of.

3.4 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION 310515

SECTION 310519.13 - GEOTEXTILES FOR EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Woven geotextile material.
2. Nonwoven geotextile material.

B. Related Requirements:

1. Section 310515 “Soils and Aggregates for Earthwork” for fill and grading materials.
2. Section 312000 “Earthwork” for excavation and backfilling procedures.
3. Section 312333 “Trenching and Backfilling” for trenching and backfilling procedures.
4. Section 312500 “Erosion and Sedimentation Controls” for erosion and sedimentation control devices.
5. Section 329119 “Landscape Grading” for placing, leveling, and compacting topsoil materials prior to final landscaping.

1.3 ACTION SUBMITTALS

A. Section 013300 – “Submittal Procedures”: Requirements for submittals. Submit items in this Article at least 30 days prior to installation.

B. Product Data: Submit certified test results from the manufacturer including tensile strength, elongation, thickness, UV resistance, and other material properties.

C. Shop Drawings: Indicate fabric layout, seam locations, and overlap details in installation drawings. Provide installation schedule.

D. Samples for Verification:

1. Submit samples, full width by 12 inches long, for each type and weight of geotextile used on Project, illustrating thickness, color, and texture.
2. Submit samples, 12 inches by 24 inches long, for each type and weight of geotextile used on Project, illustrating each field seaming method.
3. Submit samples of securing pin and washer.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

B. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures and quality control and quality assurance.

C. Manufacturer’s quality control program and manual, including a description of laboratory facilities.

D. Source Quality-Control Submittals: Provide results of factory tests and inspections, including test results that indicate materials meet the requirements of PART 2.

E. Field Quality-Control Submittals: Provide results of Contractor-furnished tests and inspections.

F. Qualifications Statements:

1. Submit qualifications for manufacturer and installer.
2. Submit manufacturer's approval of installer.

1.5 CLOSEOUT SUBMITTALS

A. Section 017300 “Execution” for requirements of submittals.

B. Project Record Documents: Record actual locations of geotextile material, including placement depth.

1.6 QUALITY ASSURANCE

A. Perform work according to recommendations of the manufacturer.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 “Product Requirements” for requirements of transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging that identifies the manufacturer/supplier’s name, style, and roll number. Inspect for damage.

C. Comply with ASTM D 4873.

D. Store materials according to manufacturer instructions.

E. Protection:

1. Protect materials from moisture, dust, chemicals, UV radiation or other environmental conditions that might damage the geotextile by storing at least 3 inches off the ground in a clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.9 WARRANTY

A. Special Warranty: Installer agrees to repair or replace geotextile related products that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS - WOVEN GEOTEXTILES

A. Manufacturers:

1. Furnish materials according to RIDOT Bluebook standards.

B. Description:

1. Non-biodegradable, non-reactive (for pH of three to eleven), UV-resistant, insect/rodent-resistant woven monofilament material consisting of polypropylene formed into a stable network.
2. Edges: finished to prevent separation of outer material.

C. Performance and Design Criteria:

1. When tested in accordance with ASTM D 4759, test results from any sampled roll in the lot shall meet or exceed the values listed in Table 1. Strength values are in the weaker principal direction.

TABLE 1: WOVEN GEOTEXTILE MINIMUM AVERAGE ROLL VALUES
FOR WOVEN FABRICS

PROPERTIES	TEST METHOD	UNIT	MINIMUM AVERAGE ROLL VALUES	
			Machine Direction (MD)	Cross Direction (CD)
Wide Width Tensile Strength	ASTM D 4595	lbs/in (kg/mm)	270 (122)	270 (122)
Grab Strength	ASTM D 4632	lbs (kg)	400 (181)	315 (143)
Grab Elongation	ASTM D 4632	percent	15	15
Trapezoid Tear Strength	ASTM D 4533	lbs (kg)	150 (68)	165 (75)
Mass per Unit Area	ASTM D 5261	oz/yd^2 (g/sm)	8.8 (298)	
Puncture Strength	ASTM D 6241	lbs (kg)	1,150 (521)	
UV Resistance	ASTM D 4355	percent strength retained	90	
Apparent Opening Size (Max)	ASTM D 4751	US Std. Sieve	40	
Percent Open Area (POA)	CW-02215 Mod.	percent	1	
Permittivity	ASTM D 4491	sec-1	0.9	
Water Flow Rate	ASTM D 4491	gpm/ft^2 (lpm/m^2)	70 (2,800)	

2.2 MATERIALS - NONWOVEN GEOTEXTILES

A. Manufacturers:

1. Furnish materials according to RIDOT Bluebook standards.

B. Description:

1. Non-biodegradable, non-reactive (for pH of three to eleven), UV-resistant, insect/rodent-resistant nonwoven needle punched material consisting of filaments formed into a stable network.
2. Edges: finished to prevent separation of outer material.

C. Performance and Design Criteria:

1. When tested in accordance with ASTM D 4759, test results from any sampled roll in the lot shall meet or exceed the values listed in Table 1. Strength values are in the weaker principal direction.

TABLE 1: NONWOVEN GEOTEXTILE MINIMUM AVERAGE ROLL VALUES

PROPERTIES	TEST METHOD	UNIT	6 oz	8 oz	10 oz
Mass per Unit Area	ASTM D 5261	oz/yd2 (g/sm)	6 (203)	8 (271)	10 (339)
Thickness	ASTM D 5199	mils (mm)	75 (1.90)	90 (2.29)	108 (2.74)
Grab Strength	ASTM D 4632	lbs (kg)	160 (73)	220 (100)	260 (118)
Grab Elongation	ASTM D 4632	percent	50	50	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kg)	60 (27)	80 (36)	100 (45)
Puncture Strength	ASTM D 4833/ D 6241	lbs (kg)	90 (41)	120 (54)	165 (175)
Water Flow Rate	ASTM D 4491	gpm/ft2 (lpm/m2)	110	95	75
Permittivity	ASTM D 4491	sec-1	1.5	1.2	1.0
Apparent Opening Size (Max)	ASTM D 4751	inch (mm) US Std. Sieve	0.008 (0.212) 70	0.007 (0.180) 80	0.006 (0.150) 100
UV Resistance	ASTM D 4355	percent strength retained	70	70	70

2.3 MATERIALS - ACCESSORIES

A. Use products to secure geotextile fabrics as recommended by geotextile manufacturer.

2.4 SOURCE QUALITY CONTROL

A. Section 014000 “Quality Requirements” for requirements of testing, inspection, and analysis.

B. If requested by the OWNER, provide materials for Quality Assurance Laboratory (QAL) testing by an independent GRI accredited laboratory to confirm conformance testing results.

C. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Section 017300 “Execution” for requirements of installation examination.

B. The Engineer shall inspect subgrade to verify that underlying surface is smooth and free of ruts or protrusions that could damage geotextile material and that subgrade has been properly prepared.

C. Subgrade Material and Compaction Requirements: As specified in Section 312333 “Trenching and Backfilling” and 312000 “Earthwork”.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's published installation instructions. Do not install damaged materials.

B. Geotextile Material:

1. Lay and maintain smooth and free of tensile stresses, folds, wrinkles, or creases.
2. Ensure that material is in direct contact with subgrade.
3. Orientate with long dimension of each sheet parallel to direction of slope and in accordance with the manufacturer’s recommendations and approved shop drawings.
4. Minimum Unseamed Joints Overlap: 18 inches.

C. Securement Pins or Staples:

1. Insert through geotextile midway between edges of overlaps and minimum 6 inches from free edges.
2. Minimum Spacing:

    a. Slopes Steeper than 3 Horizontal on 1 Vertical: 24 inches o.c.
    b. Slopes 3 Horizontal on 1 Vertical to 4 Horizontal on 1 Vertical: 3 feet o.c.
    c. Slopes Flatter than 4 Horizontal on 1 Vertical: 5 feet o.c.

3. Ensure that washer bears against geotextile.

D. Field Seams:

1. Minimum Seamed Joints Overlap: 12 inches at longitudinal and transverse joints.
2. Seams across Slope: Lap upper panel over lower panel.
3. Sewn Seams:

    a. Continuously sew seams on slopes steeper than 1 vertical on 1 horizontal.
    b. Stitch Type: As recommended by geotextile manufacturer.
    c. Tie off thread at the end of each seam to prevent unraveling.

4. Thermal Seams:

    a. As recommended by geotextile manufacturer.
    b. Comply with ASTM D 4886.

E. Penetrations: recommended by geotextile manufacturer.

F. Repairing Damaged Geotextiles:

1. Repair torn or damaged geotextile by placing patch of same type of geotextile over damaged area minimum of 12 inches beyond edge of damaged area and fasten as recommended by geotextile manufacturer.
2. Remove and replace geotextile rolls which cannot be repaired.

G. Fill and Cover:

1. Place fill to prevent tensile stress or wrinkles in geotextile.
2. Place fill from bottom of side-slopes upward.
3. Do not drop fill from height greater than 3 feet.

3.3 FIELD QUALITY CONTROL

A. Section 014000 “Quality Requirements” for requirements of inspecting and testing.

B. Testing: Perform one test for every 100,000 sq. ft. (10,000 sq. m.) according to EPA/600/R-93/182 requirements, including testing procedures.

C. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section as required on Site for installation, inspection, and field testing.

D. Acceptance:

1. The Engineer will inspect installation and identify repairs or modifications necessary to perform as specified and rerun tests.
2. Make final adjustments and repairs under direction of The Engineer or manufacturer's representative.

3.4 PROTECTION

A. Section 017300 “Execution” for requirements of protecting finished Work.

B. Ballast: Adequate to prevent uplift of material by wind.

C. UV Exposure: Do not leave material uncovered for more than 14 days after installation.

D. Do not use staples or pins to hold geotextiles in place where located adjacent to other geosynthetic layers that could be damaged.

E. Do not operate equipment directly on top of geotextile.

END OF SECTION 310519.13

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Stripping and stockpiling rock.
6. Removing above- and below-grade site improvements.
7. Disconnecting, capping or sealing, and abandoning site utilities in place.
8. Temporary erosion and sedimentation control.

B. Related Requirements:

1. Section 011000 “Summary” for temporary protection of existing vegetation.
2. Section 312316 “Rock Removal” for rock and boulder excavation.
3. Section 312500 “Erosion and Sedimentation Controls” for temporary protection of erosion and sedimentation.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction as required.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated according to requirements in Section 011000 "Summary."

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain OWNER's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Topsoil stripping and stockpiling program.

C. Rock stockpiling program.

D. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

E. Burning: Documentation of compliance with burning requirements and permitting of authorities having jurisdiction. Identify locations and conditions under which burning will be performed.

1.7 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

B. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

C. Conform to applicable code for environmental requirements, disposal of debris.

D. Perform Work in accordance with RIDOT Bluebook standards.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed roadways if required by OWNER or authorities having jurisdiction.
3. Also see Article 6.23 of the City of Providence Special Conditions.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining OWNER's property will be obtained by OWNER before award of Contract.

1. Do not proceed with work on adjoining property until directed by Engineer.

C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on OWNER's premises where indicated.

D. Utility Locator Service: Notify Dig Safe System for area where Project is located before site clearing.

E. Do not commence site clearing operations until temporary erosion- and sedimentation- control and plant-protection measures are in place.

F. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earthwork."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 011000 "Summary."

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to OWNER.

D. Call Local Utility Line Information service not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.
2. Also see Article 6.39 of the City of Providence Special Conditions.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 011000 "Summary" and Article 6.13 of the City of Providence Special Conditions.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 011000 "Summary."

3.4 EXISTING UTILITIES

A. OWNER will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor. Also see Article 6.39 of the City of Providence Special Conditions.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.
2. OWNER will arrange to shut off indicated utilities when requested by Contractor.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Engineer's written permission.

E. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and stockpile in areas approved by Engineer.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.6 STOCKPILING ROCK

A. Remove from construction area naturally formed rocks that measure more than 1 foot across in least dimension. Do not include excavated or crushed rock.

1. Separate or wash off non-rock materials from rocks, including soil, clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

B. Stockpile rock away from edge of excavations without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.

1. Limit height of rock stockpiles to 36 inches.
2. Do not stockpile rock within protection zones.
3. Dispose of surplus rock. Surplus rock is that which exceeds quantity indicated to be stockpiled or reused.
4. Stockpile surplus rock to allow later use by OWNER.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated or necessary.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off OWNER's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other project work.

END OF SECTION 311000

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. General: Earthwork includes clearing and stripping, procurement of on-site and imported fill material, excavating, placing, and compacting fill and backfill, structural excavating and backfilling, transportation and storage of excess earthwork materials; disposal of unsuitable, waste, and surplus materials; restoration of excavation and trench surfaces; and subsidiary work necessary to complete the grading of developed areas to conform with required lines, grades, and slopes.

B. Work includes but is not necessarily limited to; excavation for structures, manholes, pipes, paving; embankments; grading; and related work such as sheeting, bracing and dewatering.

C. Provide services of a licensed Professional Engineer to prepare temporary excavation support system, dewatering system designs, and submittals.

D. Provide temporary excavation support systems, including sheeting, shoring, and bracing, to ensure the safety of personnel and protect adjacent structures, piping, and other materials in accordance with Federal, State and local laws, regulations, and requirements. Temporary excavation support systems are specified in Section 315000 “Excavation Support and Protection.”

E. Provide temporary dewatering, surface water control systems, and operate to dewater and maintain excavations in a dry condition. Control drainage into excavations and remove seepage water and rainwater. Dewatering and surface water control are specified in Section 312319 “Dewatering.”

F. Examine site and review available geotechnical report prior to submitting a proposal, taking into consideration project conditions that may affect the work. OWNER and Design Engineer do not assume responsibility for variations of subsurface conditions at locations other than places shown and at the time investigations were made.

G. Do not initiate extra work without written notification to OWNER and Engineer and receiving OWNER’s written approval in response.

H. Protect existing structures and utilities that remain.

I. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for recording pre-excavation and earthwork progress.
2. Section 310515 “Soils and Aggregates for Earthwork” for fill materials.
3. Section 310519.13 “Geotextiles for Earthwork” for geotextile materials.
4. Section 311000 "Site Clearing" for site preparation work, including stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
5. Section 312333 “Trenching and Backfilling” for stated work.
6. Section 312316 “Rock Removal” for excavation of rock and boulders.
7. Section 312319 "Dewatering" for controlling surface and groundwater and disposing of water during construction.
8. Section 312500 “Erosion and Sedimentation Controls” for temporary stated work.
9. Section 315000 "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

C. Coverage: Pass of compaction equipment over the complete surface area of exposed lift or subgrade to receive compaction.

D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Additional Excavation: Excavation as directed by Engineer to correct Contractor’s work not in compliance with Contract Documents, which will be performed without additional compensation.
3. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
4. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be provided without additional compensation.

E. Finished Grade: Required final grade elevation indicated on Drawings. Spot elevations take precedent over proposed contours.

F. In-the-Dry: An excavation subgrade where groundwater level: has been lowered to at least 2 feet below lowest level of excavation; is stable with no ponded water, mud, or muck; is able to support construction equipment without rutting or disturbance; and is suitable for placement and compaction of fill material, pipe, or concrete foundations.

G. Objectionable Material: Includes topsoil, organic matter, contaminated soil, construction debris, perishable materials, snow, ice, frozen earth, and rocks or lumps of cemented soils over 6 inches in maximum dimension.

H. Optimum Moisture Content: Moisture content (percent by dry weight) corresponding to maximum dry density of the same material as determined by ASTM Test Method D1557.

I. Over-excavation: Removal of unsuitable soil or objectionable material at or below the normal grade of excavation or subgrade as required, or otherwise indicated on Drawings/scope of work.

J. Percent Compaction: Required in-place dry density of the material, expressed as a percentage of the maximum dry density of the same material, as determined in the laboratory by ASTM Test Method D698.

K. Structures: Buildings, wet wells, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, manholes and vaults, or other man-made stationary features constructed above or below the ground surface.

L. Subgrade: Required surface of subsoil, borrow fill, or compacted fill that is immediately beneath site improvements, especially dimensioned fill, paving, or other surfacing material.

M. Unsuitable Soil: Includes existing fill materials, organic soils, weak native soils, or clays with a plasticity index of greater than 30, and any materials that cannot be properly placed and compacted as specified.

N. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

O. Zone of Influence: A line extending at least 2 feet beyond foundation or pipeline edge, then outward and downward at a slope of 1 horizontal to 1 vertical. Do no excavation below foundation of existing structures or pipeline.

P. Professional Engineer: Registered Professional Engineer meeting project qualifications and who is hired by Contractor.

Q. The Engineer: The Engineer or designated representative hired by OWNER.

1. Approval given by the Engineer shall not relieve Contractor of its responsibilities for performing the work in accordance with Contract Document requirements.

1.4 ACTION SUBMITTALS

A. Coordinate various submittal types required by this Section with requirements of dewatering, support of excavation, rock removal, and geotechnical instrumentation submittals specified in other Sections.

B. Slope Stability Evaluation: Submit a temporary excavation slope stability evaluation in accordance with OSHA for temporary slopes over 20 feet in height or where existing or proposed facilities or property limits are located at the top of the slope and within a distance from the top of the slope equal to the slope height.

1. Prepare evaluation by a licensed Professional Engineer registered in the State of Rhode Island where the work occurs.

C. Site Characterization Data: Submit following information regarding off-site source and material:

1. Site location.
2. Present and past usage of the source site and material.
3. Previously existing reports associated with an assessment of source site relating to presence of oil or other hazardous materials.
4. Location within the site from which the material will be obtained.

D. Samples: Submit a representative sample weighing approximately 50 pounds of each fill material, filter sand, and crushed stone contained in sealed 5 gallon containers, at least 30 calendar days prior to date of anticipated use of each material.

E. Submit laboratory test results for fill materials that include maximum density, gradation, Atterberg limits, sand equivalent, and other applicable criteria, at least 72 hours prior to importing or placing fill.

F. Prepare excavation support system designs by a licensed Professional Engineer, registered in the State of Rhode Island in which the work is located and having a minimum of 5 years of professional experience in design and construction of excavation support systems.

1. Submit an original and three copies of licensed Professional Engineer's certification, on PE form specified in Section 013300 “Submittal Procedures,” stating excavation support systems designs have been prepared by Professional Engineer who is responsible for their execution.

1.5 INFORMATIONAL SUBMITTALS

A. Construction and Operations Plan: Submit proposed methods of construction, including earthwork operations, excavation limits, slopes, fill material moisture conditioning and handling, compaction equipment, excavation support systems designs, backfilling and filling and compaction, and material sources.

1. Include additional submittal requirements related to schedule, work sequence, and on-site and off-site storage when necessary based on project conditions.
2. Submit excavation support system plan as prepared by registered Professional Engineer complying with requirements stated in previous Article.

B. Submit copies of field daily reports by soil technician at the end of each workday that earthwork and grading operations occur.

C. Upon completion of earthwork and grading operations, submit an as-graded map showing density test numbers and locations, a table of density test results and depths, and a certification of compliance by geotechnical engineer in charge.

D. Qualification Data: For qualified testing agency to conduct geotechnical observation, testing and documentation. include qualifications of firm, resumes of soil technicians assigned to the project, and licensed geotechnical engineer in charge.

1. Firm Qualifications: Meet ASTM D3740.
2. Soil Technicians: Have minimum three years demonstrated experience in earthwork and grading operations and satisfy certification requirements of agency having local jurisdiction.

    a. The Engineer reserves right to request substitution of soil technicians assigned to field work. Do not substitute assigned soil technicians without prior approval of the Engineer.

E. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.6 QUALITY ASSURANCE

A. Excavation, trenching, sheeting, bracing, and similar work shall comply with requirements of OSHA excavation safety standards, 29 CFR Part 1926 Subpart P and local authorities having jurisdiction. Where conflict between OSHA, State and local regulations exists, apply most stringent requirements.

B. At least three working days prior to starting any excavation, notify the appropriate regional notification center for underground utilities and underground utility OWNERs who are not members of notification center. To obtain area specific information for project site, refer to www.call 811.com.

C. Quality Control Testing for Off-site Borrow Materials:

1. Chemical testing will not be required where site characterization of off-site borrow sources indicates that soils are acceptable for use. If site characterization data or materials are suspected of being contaminated, perform chemical testing as directed by The Engineer with no additional compensation.
2. Chemical Test Data: Test each material source requiring testing by a person experienced in sample collection who is a registered Professional Engineer or geologist, or certified groundwater or environmental professional registered in the State of Rhode Island. Submit samples of each proposed material to a chemical analytical laboratory, certified by the governing agency, for following analyses:

    a. Volatile Organic Compounds: EPA 8240 plus Hazardous Substance List (HSL) Parameters.
    b. Acid and Base Neutral Extractable Organic Compounds: EPA 8270.
    c. Pesticides and PCBs: EPA 8080.
    d. Total Petroleum Hydrocarbons: Infrared Method, EPA 9071/418.1.

e. Thirteen Priority Pollutant Metals: EPA 7000 Series.
f. Total Cyanide: EPA 9012.

3. Obtain and test off-site borrow samples in accordance with criteria established by the Engineer. Submit results for review and approval prior to use on site.

1.7 FIELD CONDITIONS

A. Be responsible for construction layout and reference staking necessary for proper control and satisfactory completion of structures, cutting, filling, grading, drainage, fencing, embankment improvements, curbing, and other appurtenances.

B. Perform construction layout and staking by a Professional Surveyor or Professional Engineer registered in State of Rhode Island where project occurs, experienced and skilled in construction layout and staking requirements.

C. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earthwork operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by OWNER or authorities having jurisdiction.
3. Also see City of Providence Special Condition Article 6.23 “Traffic Control.”

D. Improvements on Adjoining Property: Authority for performing earthwork indicated on property adjoining OWNER's property will be obtained by OWNER before award of Contract.

1. Do not proceed with work on adjoining property until directed by the Engineer.

E. Utility Locator Service: Notify "Dig Safe System" for area where Project is located before beginning earthwork operations.

F. Do not commence earthwork operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 311000 "Site Clearing" and Section 312500 “Erosion and Sedimentation Controls” are in place.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Fill materials designated for use in this Section are specified in Section 310515 “Soils and Aggregates for Earthwork.”

B. On-Site Fill Material: Earth and rock material obtained at project site during excavation, following clearing and stripping, from which any Unsuitable Soil or Objectionable Material has been removed.

C. General: Provide imported fill materials when sufficient satisfactory soil materials are not available from excavations.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, fencing, landscaping, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1. If necessary, remove and restore or replace curbing, driveway aprons, and fencing after performing backfilling work.
2. Replace existing facilities damaged by construction with new material fully equal to existing without additional compensation.

B. Prior to and During Earthwork Operations:

1. Protect and maintain erosion and sedimentation controls; coordinate with Section 312500 “Erosion and Sedimentation Controls.”
2. Provide, monitor, and maintain excavation support; coordinate with Section 315000 “Excavation Support and Protection.”

    a. Use excavation support system for excavations within the zone of influence for existing structures or utilities.
    b. Do not permit excavations below base level of adjacent foundations or retaining walls, unless excavation design and bracing includes an analysis of structure’s stability supported by the foundation. When necessary due to project conditions, incorporate required bracing and foundation underpinning.

3. Provide, monitor, and maintain dewatering and drainage systems; coordinate with Section 312319 “Dewatering.”

C. Test Pits:

1. Perform exploratory excavation work, test pits, for purpose of verifying the location of underground utilities and structures and to check for unknown utilities and structures, prior to commencing excavation work.
2. Backfill and compact test pits as soon as desired information has been obtained. Stabilize backfilled surfaces in accordance with approved erosion and sedimentation control plans.
3. Also see City of Providence Special Condition Article 6.54 “Test Control.”

D. Clearing and Stripping. Initially clear and strip ground surfaces beneath planned structures and in areas requiring excavation or filling of organic material and debris. Do not use those materials as On-Site Fill Material.

E. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

F. Saw cut existing pavement with a saw, wheel, or pneumatic chisel along straight lines before excavating.

3.2 DEWATERING AND DRAINAGE

A. Provide dewatering and drainage in accordance with Section 312319 "Dewatering". This Article supplements those requirements.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff and groundwater seepage away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Prior to excavation, verify groundwater will be at required level indicated on approved dewatering and drainage submittal.

E. Accomplish dewatering by methods that preserve undisturbed state of subgrade soils. Dewater in a manner to prevent boiling, detrimental under-seepage, or disturbance at excavation base.

3.3 SUPPORT OF EXCAVATION

A. Provide excavation support in accordance with Section 315000 "Excavation Support and Protection". This Article supplements those requirements.

B. Install excavation support in accordance with reviewed Shop Drawings prior to beginning excavation work. Maintain excavation supports that are required to remain in place, if applicable, as indicated on Drawings or as required by approved Shop Drawings.

C. OWNER or Engineer may direct that certain excavation supports remain in place or be cut off at any specific elevation. Supports directed by OWNER or Engineer to be left in place and not so designated on Contract Documents will be paid for according to Contract provisions for changes in the Work.

D. The right of OWNER or Engineer to direct that certain excavation supports remain in place shall not be construed as creating any obligation on OWNER or Engineer to give such direction, nor shall failure to give such direction relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient excavation supports to prevent any movement of the ground or damage to adjacent structures.

E. Construct temporary excavation slopes in accordance with the requirements of OSHA excavation

safety standards and approved Shop Drawings.

F. Where allowed, carefully remove excavation supports in a manner without endangering the Work or other adjacent structures, utilities, or property. Immediately fill voids left or caused by withdrawal of supports with sand and compact.

3.4 EXCAVATION

A. Include material of every description and of whatever substance encountered as an unclassified excavation.

B. General: Excavate on-site soils using standard earthmoving equipment. Excavation in dense soil or rock may require special equipment. Do not plough, scrape, or dig earth with machinery so near to finished subgrade to result in excavation of or disturbance of below grade material.

C. Make excavations to grades required and in widths sufficient for laying of pipe, construction of the structure, installing bracing, excavation supports, dewatering and drainage facilities, and working clearances.

D. Perform excavation in-the-dry and accomplished by methods which preserve the natural undisturbed condition of subgrade soils.

E. Moisture Sensitive Soils: Use a smooth-edge bucket to excavate last one foot of depth when excavation is to end in such soils.

F. If excavation bottom is removed below the limits shown on Drawings, specified, or directed by the OWNER/Engineer, refill with screened gravel satisfactory to the Engineer without additional compensation.

G. When excavation has reached prescribed depths, notify the Engineer who will observe the conditions. If materials and conditions are not satisfactory, the Engineer will issue instructions for corrective procedures. The Engineer will be the sole judge as to whether the work has been accomplished satisfactorily.

H. Subgrade soils that have become soft, loose, quick, or otherwise unsatisfactory due to inadequate excavation, dewatering, or other construction methods in the opinion of the Engineer, remove existing soil and replaced with screened gravel as acceptable to the Engineer at Contractor's expense.

I. Exposed subgrades in large open areas shall be proof rolled with at least two overlapping coverages of a vibratory drum roller with a minimum static drum weight of 10 ton. Conduct proof-rolling in presence of the Engineer. The Engineer will waive this requirement, if in its opinion the subgrade will be rendered unsuitable by such proof-rolling.

1. Confined Areas: Proof-roll with hand operated vibratory equipment that is approved by the Engineer.

J. Perform over excavation at the Engineer’s request to remove unsuitable soil, objectionable material, or other materials as determined by the Engineer and to such depth and width as directed. Replace with suitable material as directed by the Engineer.

1. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

K. Perform excavation for pipelines beneath structures and excavation for footings with excavating equipment operating from the subgrade for the structure, while in-the-dry and in a manner preserving the undisturbed state of subgrade soils.

L. When excavations have reached the required subgrade, including any allowances for working mats or base materials and prior to their placement, notify soils testing laboratory to verify suitability of existing subgrade soils for anticipated foundation and structural loadings.

1. If existing subgrade soils are determined to be unsuitable, follow direction provided by the Engineer regarding removal and replacement with suitable materials.
2. Notify the Engineer if the revised work scope would modify Contractor's cost and thereby entitle a change to the Contract Sum. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

M. Replace over-excavation beyond the limits and depths required by Contract Documents using screened gravel satisfactory to the Engineer without additional compensation.

3.5 SUBGRADE PREPARATION

A. Notify Engineer when excavations have reached required subgrade.

B. Maintain excavated subgrade in-the-dry condition.

C. Prior to fill placement, remove objectionable material which includes, but not be limited to, pavement, topsoil, organic matter, contaminated soil, construction debris, perishable materials, snow, ice, frozen earth, and rocks or lumps of cemented soils over 6 inches in maximum dimension.

D. For subgrades consisting of granular soils, proof roll the final subgrade using at least four coverages of a vibrator plate compactor.

E. Where existing subgrade contains a significant amount of clay or cohesive soils, over-excavate sufficiently below the bottom of structure for placement of a lean concrete working mat. Remove loose or soft material from the subgrade immediately prior to placing lean concrete working mat.

F. Remove and replace soft subgrades or unusable material with screened gravel satisfactory to the.

G. During wet or freezing weather, or in areas where exposed subgrade consists of moisture-sensitive soils, take measures to protect foundation excavations once they have been approved by the Engineer. Protective measures include, but are not limited to, placing insulation blankets, placing a layer of fill, pea gravel, crushed rock, or lean concrete on the exposed subgrade, or covering the exposed subgrade with a plastic tent.

H. If additional over excavation is required due to the subgrade not being protected against wet or freezing weather, perform additional work without additional compensation.

I. Notify the Engineer to observe conditions following subgrade preparation and prior to fill placement. If existing subgrade soils are determined to be unsuitable, follow direction provided

by the Engineer regarding removal and replacement with suitable materials.

1. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

3.6 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Protect from precipitation.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.7 FILL PLACEMENT AND COMPACTION PROCEDURES

A. Fill and Backfill: Place materials in lifts to suit specified compaction requirements to required lines and grades, making allowances for settlement and placement of cover materials, such as topsoil or sod. Correct soft spots or uncompacted areas.

B. Do not place or compact fill and backfill when materials are too wet to properly compact.

1. In-place Soil Moisture Content: Maximum of three percentage points above optimum moisture content of soil, as determined by laboratory test of moisture-density relation appropriate to specified level of compaction.

C. Structural Fill and Embankment Fill: Construct to required lines and grades, making allowances for settlement and placement of cover materials, such as topsoil and sod. Correct soft spots or uncompacted areas.

D. Fill material shall be free of snow, ice, frost, and frozen earth. Do not place fill materials on frozen surfaces or surfaces covered by snow, ice, or frost.

E. If subgrade slopes more than 10 percent, step subgrade to produce a stable, horizontal surface for placement of fill materials. Scarify existing subgrade slope to a depth of at least 6 inches.

F. Compact filled slopes by slope rolling and trimming, or overfill and trim back to plan grade to expose a firm, smooth surface free of loose material.

G. Do not allow fill lifts to contain stones with a dimension larger than 2/3 the specified loose measure lift thickness.

H. Perform compaction in open areas using compaction equipment by any of the following methods:

1. Fully loaded ten-wheel trucks or front-end loaders.
2. Tractor dozers weighing minimum of 30,000 pounds.
3. Heavy vibratory rollers.

I. Confined Compaction: Perform compaction in confined areas, including areas within a 45- degree angle extending upward and outward from the base of a wall, and in areas where the use of large

equipment is impractical, using hand-operated vibratory equipment or mechanical tampers.

1. Do not exceed lift thickness of 6 inches, measured before compaction, when using hand operated equipment.

J. Moisture condition on-site fill material prior to placement, unless Contractor demonstrates to the Engineer in-place moisture conditioning methods can achieve the required moisture content.

K. Conduct compaction of each specified lift of fill materials by a minimum of four complete coverages with acceptable compaction equipment to a specified density as a percentage of maximum dry density as determined by ASTM D1557, unless otherwise specified.

L. Use structural fill required beneath foundations or slabs on grade, except sidewalks. Place and compact structural fill in even lifts having a maximum thickness of 8 inches, measured before compaction.

M. Use select fill and backfill material placed within 10 feet of all structures. Uniformly place and compact select fill around the structure in even lifts having a maximum thickness of 8 inches, measured before compaction.

N. Use common fill in areas beyond those designated for structural fill or select fill, unless shown or otherwise specified. Place in even lifts having a maximum thickness of 12 inches, measured before compaction.

O. Place impervious fill in controlled, even lifts having a maximum thickness (measured before compaction) of 6 inches.

1. Permeability: Compact to attain a reading of less than 1×10^{-7} cm/sec.
2. Moisture Content: Compact to optimum moisture content of minus 2 percent to plus 3 percent.

3.8 COMPACTION REQUIREMENTS

A. Perform in-place testing of compacted fill lifts to measure in-place density and water content according to ASTM D6938 and ASTM D1557.

B. Beneath Foundations and Slabs-on-Grade, except sidewalks: Compact top 12 inches of existing subgrade and each layer of fill, if applicable to:

1. Maximum Dry Density: Minimum of 95 percent for ASTM D1557.
2. Moisture Content: At or near its optimum moisture content of minus 2 percent to plus 3 percent.

C. Area Around Structures: Within 10 feet compact each fill or backfill layer to:

1. Maximum Dry Density: Minimum of 92 percent for ASTM D1557.
2. Moisture Content: At or near its optimum moisture content of minus 2 percent to plus 3 percent.

D. Embankments, Lawn, or Unimproved Areas: Does not include embankments under roadways and earth dam structures. Compact each fill or backfill layer to:

1. Maximum Dry Density: Minimum of 90 percent for ASTM D1557.
2. Moisture Content: At or near its optimum moisture content of minus 1 percent to plus 4 percent.

E. Sidewalks: Compact each fill layer to:

1. Maximum Dry Density: Minimum of 92 percent for ASTM D1557.
2. Moisture Content: At or near its optimum moisture content of minus 2 percent to plus 3 percent.

F. Roads, Paved Areas, and Roadway Embankments: Compact each layer of fill or backfill to:

1. Maximum Dry Density: Minimum of 95 percent for ASTM D1557.
2. Moisture Content: At or near its optimum moisture content of minus 2 percent to plus 3 percent.

3.9 DISPOSAL OF UNSUITABLE, WASTE, AND SURPLUS EXCAVATED MATERIALS

A. Unsuitable soil, objectionable material, waste, and surplus excavated material shall be removed and disposed of off-site. Materials may be temporarily stockpiled in an area within the limits of construction that does not disrupt construction activities, create any nuisances or safety hazards, or otherwise restricts access to work site.

B. Also see City of Providence Special Condition Article 6.81 “Disposal of Surplus Materials.”

C. Topsoil or loam excavated under this Section may be salvaged for use as specified under Section 329119 “Landscape Grading”, as approved by the Engineer.

3.10 GRADING

A. Perform grading to lines and grades shown on Drawings. Remove objectionable materials encountered within the limits indicated and disposed of off-site. Completely and continuously drained and dewatered subgrades throughout the grading process. Install temporary drains and drainage ditches to intercept or divert surface water that may affect the execution or condition of grading work.

B. If it is not possible at the time of grading to place material in its proper section of the Work, stockpile it in approved areas for later use. No additional compensation will be made for stockpiling or double handling of excavated materials.

C. In cut areas, remove loose or protruding rocks in slopes to line or finished grade of the slope. Uniformly dress, cut, and fill slopes to slope cross-section and alignment shown on Drawings, unless otherwise directed by the Engineer.

3.11 RIPRAP AND SLOPE STABILIZATION

A. Prior to installation of riprap, install erosion control blankets on slopes in accordance with manufacturer's instructions.

1. Properly prepare area to be covered before the blanket is applied.
2. When the blanket is unrolled, place netting on top with fibers in contact with the soil over the entire area.
3. Butt blankets snugly at ends and sides, placing blankets a minimum of three rows, each four-foot wide, for a total width of 12 feet.
4. Staple blankets together in accordance with manufacturer's instructions.
5. Secure blankets by driving staple vertically into the ground, spaced approximately 6 feet apart, on each side and one row in the center, alternately spaced between each side.
6. Do not overlap adjoining blankets. Utilize a common row of staples to attach to ground.

B. Place riprap in conjunction with embankment construction with only sufficient lag in construction of riprap protection necessary to allow for proper construction of the portion of embankment protected and to prevent mixture of embankment and riprap material.

1. Place and grade bank run gravel to a depth of 6 inches to obtain a continuous uninterrupted bed of required thickness within the required limits.
2. Compact by a minimum one coverage by a crawler-type tractor with a total weight, including blade and equipment, of not less than 30,000 pounds.

C. Hand-place riprap on compacted gravel bed; do not dump materials. Lay stones so maximum dimension is perpendicular to the bed. Place stones so weight of each stone is carried by underlying material and not by adjacent stones. Place large stones at the bottom of slope. Fill spaces between stones with spalls of suitable size to construct a solid, stable slope, free from large voids and defects, and to protect embankments against erosion.

3.12 FIELD QUALITY CONTROL

A. Test and observe materials as described in this Article. Cooperate by allowing free access to work for selection of test materials and observations.

B. General Testing Requirements:

1. At Structures: Prior to placement of bedding material, concrete work mats, structural fill or structural concrete, coordinate with Soils Testing Laboratory to verify suitability of existing subgrade soil.

2. Backfill and Fill: Prior to and during the placement of backfill and fill coordinate with Soils Testing Laboratory to perform in-place soil density tests to verify that backfill and fill material has been placed and compacted in accordance with specified compaction requirements.

   a. Provide minimum 48 hours' notice prior to placement of backfill and fill.

3. Subgrade: Do not cover with fill without observation, testing, and approval by Soils Testing Laboratory.

   a. Earthwork activities performed without properly scheduled inspection are subject to removal and replacement or additional testing as directed by the Engineer without additional compensation.

C. Test materials by a certified independent laboratory, engaged by Contractor and acceptable to the

Engineer, demonstrating conformance with project requirements. Deliver test reports and material certifications to the Engineer before using any material in the work.

D. If field test results are not in conformance with project requirements, costs involved in correcting deficiencies in compacted materials to satisfaction of the Engineer without additional compensation.

E. Earthwork activities performed without properly scheduled inspection are subject to removal and replacement or additional testing as directed by the Engineer without additional compensation.

F. Testing methods shall comply with latest ASTM or equivalent AASHTO Standards applicable during bidding.

G. During placement of bedding, backfill, and fill, perform in-place soil density testing to confirm that fill material has been compacted in accordance with project requirements. The Engineer may designate areas to be tested. Notify the Engineer at least 72 hours in advance of scheduled compaction testing. In place soil density tests on backfill and fill material shall be as required by authorities having jurisdiction, project geotechnical report, but in no instance, shall less than those listed:

1. Structures and Embankments: At least one density and moisture content test for each 2,500 square feet of surface area for each lift of fill at embankment, structure, and manhole locations.
2. Trench Excavations: At least one nuclear density and one moisture content test at a maximum of 50 feet intervals for each lift of fill placed or as directed by the Engineer.
3. The Engineer may designate supplemental areas to be tested at additional compensation.

H. Materials which have been previously tested may be subjected to further testing from time to time and may be rejected, if it is determined that results do not conform to project requirements. Immediately remove rejected materials when directed by the Engineer, notwithstanding results of previous testing.

I. The Engineer or OWNER may conduct additional soil testing. Cooperate fully in allowing additional test to be made, including free access to the work.

J. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

3.13 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by the Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION 312000

CITY OF PROVIDENCE,
ON-CALL SEWER AND DRAINAGE REPAIRS
(BLANKET CONTRACT 2023-2025)

SECTION 312316 - ROCK REMOVAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating, removing, and disposing of discovered rock and boulders during excavation.
2. Tools to assist rock removal.
3. Backfill in place of the excavated rock.

B. Related Requirements:

1. Section 310515 “Soils and Aggregates for Earthwork” for backfilling material.
2. Section 312000 “Earthwork” for excavation, backfilling, and filling operations.
3. Section 312333 “Trenching and Backfilling” for trenching and backfilling for utilities.
4. Section 312500 “Erosion and Sedimentation Controls.”
5. Section 315000 “Excavation Support and Protection.”

1.3 DEFINITIONS

A. Rock: Intact mass of stone, bedrock, or ledgerock.

B. Boulder: Rock fragments exceeding 1 cubic yard in volume.

C. Rock Excavation: Removal of intact rock, which in The Engineer’s opinion cannot be removed by conventional mechanical excavation equipment and requires continuous, systematic drilling, blasting, wedging, sledging, cutting, barring, jack hammering, hoe ramming or expansive chemical splitting.

D. Boulder Excavation: Removal of non-intact boulders that can be removed by conventional mechanical excavation equipment.

E. Conventional Mechanical Excavation Equipment: Bulldozer or tractor, drawing a single tooth hydraulic ripper with a minimum drawbar pull of 18,300 pounds.

F. Soil Excavation:

1. Rock fragments less than 1 cubic yard in volume that can be removed by conventional mechanical excavation.
2. Removal of earth, weathered rock, and rock fragment that can be removed by conventional mechanical excavation.
3. Soil excavation includes excavation of earth materials that are not considered as rock excavation or boulder excavation.

G. Loose or disintegrated rock, rotted shale, nested stones, hardpan, and like materials are not considered as rock or boulder.

H. Abutter: OWNER of an adjoining property.

I. The Engineer: Engineer hired by OWNER.

1.4 ACTION SUBMITTALS

A. Submit means and methods description at least two weeks prior to commencing rock and boulder excavation.

1. Identify techniques including size and energy of impact equipment and chemical properties of agents to be used for chemical splitting.
2. Name and qualifications of persons responsible for monitoring and reporting rock excavation vibrations.

B. Review by The Engineer of Contractor's submittals does not relieve Contractor of responsibility for accuracy, adequacy, and safety of rock and boulder excavation, exercising proper supervision and field judgment, and producing results specified in this Section.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Uncover rock when encountered, but do not excavate until measurements are made by The Engineer.

3.2 ROCK REMOVAL

A. Perform rock excavation by drilling, wedging, sledging, cutting, barring, jack hammering, hoe ramming, expansive chemical splitting, or other similar process in a manner, which does not cause damage to existing structures, new construction, or affecting OWNER operations.

B. Blasting is not allowed.

C. Perform rock excavation operations to comply with project, state, and local noise and dust regulations.

D. When below grade excavation methods shatter rock and is unfit for subgrade, as determined by The Engineer, remove rock and refill excavation with thoroughly compacted screened gravel, structural fill, or lean concrete without additional compensation.

E. When directed by The Engineer during the work, remove dirt and loose rock from designated areas and thoroughly clean rock surface; use steam to melt snow and ice, if necessary. Remove water in depressions so the whole surface of designated area can be inspected to determine whether seams or other defects exist.

F. Leave surfaces of rock foundations sufficiently rough to bond well with concrete. When required, cut rock to rough benches or steps.

G. Before installing masonry or embankment on or against rock, free rock surfaces from vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Use picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means to accomplish this cleaning. Remove free water left on rock surface.

3.3 BOULDER EXCAVATION

A. Boulder and rock fragments up to 1 cubic yard in volume may be reduced in size by rock excavation methods to simplify its removal.

3.4 DISPOSAL OF ROCK AND BOULDERS

A. Fragmented rock with dimensions not exceeding 6 inches in any direction may be mixed with common fill and used as common fill in accordance with Section 310515 “Soils and Aggregates for Earthwork.”

B. Crushed and screened rock and boulders may be for reused in the work, provided resultant materials meet requirements for gravel, crushed stone, or structural fill as specified in Section 310515 “Soils and Aggregates for Earthwork.

C. Stockpile excavated material without excessive surcharge on excavation or obstructing free access to hydrants and gate valves. Avoid inconvenience to traffic and abutters as much as possible.

D. Should conditions make it impracticable or unsafe to stack material adjacent to excavations, haul and store material at provided location. When required, re-handle and use it for trench backfilling without additional compensation.

E. Replace rock and boulder material disposed of by wasting using available surplus suitable soils. Where there is a deficiency of surplus backfill material, provide common fill without additional compensation.

F. Remove and dispose off-site unused rock and boulders.

END OF SECTION 312316

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes temporary construction dewatering and surface water control and incorporates the design, equipment, materials, installation, operation, protection, monitoring and removal of dewatering and drainage system. Provide dewatering system sufficient to lower groundwater and collect surface water, regardless of groundwater level or rainfall at any time during the work.

B. Obtain and pay for permits required for dewatering and drainage systems. Implement measurements to comply with dewatering and discharge permits requirements.

C. Related Requirements:

1. Section 310515 “Soils and Aggregates for Earthwork” for filter sand.
2. Section 310519 “Geotextiles for Earthwork” for filter fabric materials.
3. Section 312000 "Earthwork" for excavating, backfilling.
4. Section 312316 “Rock Removal” for removal of rock and boulders.
5. Section 312333 “Trenching and Backfilling” for trenching, backfilling, and compaction.
6. Section 312500 “Erosion and Sedimentation Controls” for controlling surface-water runoff and ponding.
7. Section 315000 “Excavation Support and Protection” for support of excavations.
8. Division 32 “Site Improvements” for various Sections relating to civil and landscape related work.

1.3 DEFINITIONS

A. In-the-Dry: An excavation subgrade where all of the following are met:

1. Groundwater level has been lowered to at least 2 feet below lowest excavation level.
2. Subgrade is stable with no ponded water, mud, or muck.
3. Subgrade is able to support construction equipment without rutting or disturbance.
4. Subgrade is suitable for placement and compaction of fill material, pipe, or concrete foundations.

B. Contractor’s Engineered Design: Design prepared on behalf of Contractor by a registered Professional Engineer.

C. Professional Engineer: Registered Professional Engineer meeting project qualifications and who is hired by Contractor.

D. The Engineer: Engineer hired by OWNER.

1. Approvals given by The Engineer shall not relieve Contractor of its responsibilities for performing the work in accordance with Contract Document requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Verify availability of Installer's personnel, equipment, and facilities needed to perform the work, make progress and avoid delays.
2. Review condition of site to be dewatered including coordination with temporary erosion-control measures, excavation support systems, and temporary controls and protections.
3. Review geotechnical report.
4. Review proposed site clearing and excavations.
5. Review existing utilities and subsurface conditions.
6. Review observation and monitoring of dewatering system.
7. Review sampling and testing requirements for discharge.
8. Review pretreatment requirements prior to discharge, discharge location(s), and flow rate requirements.

1.5 ACTION SUBMITTALS

A. Design Plan: Submit written dewatering and drainage system design plan, prepared by a qualified Professional Engineer, that includes:

1. Description of proposed dewatering system and installation methods to be used for system elements and observation wells.
2. Description of equipment, drilling methods, holes sizes, filter sand placement techniques, sealing materials, development techniques, number and location of dewatering points and observations wells.
3. Dewatering system design calculations demonstrating that the proposed system meets all requirements herein and elsewhere.
4. Sequence of well and well-point placement coordinated with support of excavation system installation and control procedures to be adopted, if dewatering problems arise.
5. Identification of anticipated area influenced by dewatering system and address impacts to adjacent existing and proposed structures.
6. Coordinate dewatering and drainage submittals with excavation and support of excavation submittals.

B. Shop Drawings: For dewatering system, prepared by a qualified Professional Engineer.

1. Include plans, elevations, sections, and details.
2. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
3. Include pump capacity and anticipated discharge rate.
4. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
5. Show areas and depths of excavation to be dewatered and adjacent structures or facilities within the anticipated area influence.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor and Professional Engineer.

B. Field quality-control reports.

C. Existing Conditions: Using photographs, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by dewatering operations. Submit before Work begins.

D. Record Drawings: Identify locations and depths of capped wells and well points and other abandoned-in-place dewatering equipment.

E. Discharge sampling log, testing results of effluent samples and flow rate record.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer that has specialized in installation of dewatering systems and dewatering work and having a minimum of 5 years' experience.

B. Professional Engineer Qualifications: Licensed Professional Engineer registered in the State of Rhode Island where project is located; having a minimum of 5 years' experience in design and construction of dewatering and drainage systems; and having completed not less than 5 successful dewatering and drainage projects of equal type, size, and complexity to that required for the work.

C. Comply with authorities having jurisdiction for the following:

1. Drilling and abandoning of wells used for dewatering systems.
2. Water discharge and disposal from dewatering operations.

D. Obtain permit from EPA under National Pollutant Discharge Elimination System (NPDES), for storm water discharge from construction sites.

1.8 FIELD CONDITIONS

A. Survey Work: Engage a qualified land surveyor or Professional Engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of surface and ground water and permit excavation and construction to proceed in-the-dry in accordance with the requirements herein and elsewhere.

1. Design dewatering system, including comprehensive engineering analysis by the Contractor's Design Engineer.
2. Continuously monitor and maintain dewatering operations to ensure required groundwater lowering, erosion control, stability of excavations, excavation support, and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

B. Primary Purpose of Work: Preserve natural undisturbed condition of subgrade soils in areas of proposed excavations.

1. Prior to excavation, lower groundwater to at least 2 feet below lowest excavation subgrade elevation.
2. Additional groundwater lowering may be necessary beyond 2 feet requirement, depending on construction methods, equipment used, and prevailing groundwater and soil conditions. Lower groundwater as necessary to complete construction in accordance with Contract Documents without additional compensation

C. Design deep wells, well points and sumps, and other groundwater control system components to prevent loss of fines from surrounding soils. Use sand filters with dewatering installations, unless screens are properly sized by Contractor's design engineer to prevent passage of fines from surrounding soils.

D. Maintain standby pumping systems and sources of standby power at various sites.

E. Design dewatering system to prevent damage to adjacent properties, buildings, structures, utilities, and facilities from dewatering operations. Be responsible for damage to properties, buildings or structures, sewers and other utility installations, pavements, and work that may result from dewatering or surface water control operations.

F. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

2.2 MATERIALS

A. Pipe for Observation Wells: ASTM D 1785, PVC Schedule 80 in minimum interior diameter of 1 inch and machine slotted having a maximum slot size of 0.020 inch.

B. Equipment: Piping, pumping, and other equipment and materials to provide control of surface water and groundwater in excavations.

C. Grout: Mixture of Portland cement and bentonite clay or sand suitable for sealing abandoned wells and piping. Also see Article 6.14 of the Special Conditions.

PART 3 - EXECUTION

3.1 GENERAL

A. Control surface water and groundwater such that:

1. Excavation to final grade is made in-the-dry.
2. Natural undisturbed conditions of subgrade soils are maintained.
3. Softening, instability, or disturbance due to presence or seepage of water does not occur.
4. Construction and backfilling proceeds in-the-dry.
5. Floatation of completed portions of work shall be prohibited.

B. Methods of groundwater control may include but are not limited to perimeter trenches and sump pumping, perimeter groundwater cutoff, well points, ejectors, deep wells, or any combination.

C. Where groundwater levels are above proposed bottom of excavation level, provide a pumped dewatering system for pre-drainage of soils prior to excavation and for maintaining lowered groundwater level until construction has been completed such that structure, pipeline, or fill will not be floated or otherwise damaged.

D. Vary type of system, spacing of dewatering units, and other details of the work depending on soil and water conditions at each location.

E. Do work in a manner to protect adjacent structures and utilities without causing loss of ground or disturbance to pipe bearing soils or soils supporting overlying or adjacent structures.

F. Install, monitor, and report data from observation wells. Evaluate collected data relative to groundwater control system performance and modify systems necessary to dewater site.

G. Locate groundwater control system components where they will not interfere with construction activities adjacent to the work area or interfere with installation and monitoring of geotechnical instrumentation including observation wells. Do not make excavations for sumps or drainage ditches within or below 1H:1V slopes extending downward and out from edges of existing or proposed foundation elements or from downward vertical footprint of pipe without approval by the Engineer.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways, if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 011000 “Summary,” Section 311000 "Site Clearing," and Section 312500 “Erosion and Sedimentation Controls” during dewatering operations.

3.3 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. Also see Article 6.14 of the Special Conditions.

3.4 SURFACE WATER CONTROL

A. Construct surface water control measures, including dikes, ditches, sumps and other methods to prevent flow of surface water into excavations and to allow construction to proceed without delay.

B. Grade excavation to divert surface water and seepage water within excavation areas into sumps and dewatering wells. Also see Article 6.14 of the Special Conditions.

3.5 EXCAVATION DEWATERING

A. Provide and maintain equipment and facilities to promptly remove and properly dispose of water entering excavations. Maintain excavations in-the-dry.

B. Excavation dewatering shall maintain the subgrade in a natural undisturbed condition and be in operation until the fill, structure or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

C. Do not place pipe, masonry, and concrete in water or submerge within 24 hours after being installed. Prevent water from flow over new masonry or concrete within four days after placement.

D. Prevent water from rising to cause unbalanced pressure on structures until concrete or mortar has set at least 24 hours. Prevent pipe flotation by promptly placing backfill.

E. Conduct dewatering to preserve natural undisturbed condition of subgrade soils at bottom of excavation.

F. If trench subgrade or excavation bottom becomes disturbed due to inadequate dewatering or drainage, excavate below normal grade as directed by the Engineer and refill with structural fill, screened gravel, or other material as approved by the Engineer without additional compensation.

G. It is expected that initial dewatering plan may be modified to suit variable soil and water conditions encountered. Dewater and excavate in a manner without causing loss of ground or disturbance to pipe bearing soil or soil that supports overlying or adjacent structures or instability of excavation or tunnel face conditions.

H. If methods do not properly dewater excavation, install additional groundwater observation wells as directed by the Engineer. Do not place pipe or structure until readings obtained from observation wells indicate that groundwater has been lowered to specified minimum of below bottom of final excavation.

I. Surround dewatering units with suitable filter sand with no fines being removed by pumping. Pump continuously from dewatering system until pipe or structure is adequately backfilled. Provide stand-by pumps.

J. Collect water entering excavations from precipitation or surface runoff in shallow ditches around excavation perimeter, drained to a sump, and pump from excavation to maintain a bottom free from standing water.

K. Dispose of drainage to an approved area as specified in Section 013543 “Environmental Protection Procedures.” Do not use existing or new sanitary sewers to dispose of drainage.

3.6 REMOVAL OF SYSTEMS

A. At completion of excavation and backfilling work and when approved by the Engineer, remove from site various pipe, deep wells, well-points, pumps, generators, observation wells, other equipment, and accessories used for groundwater and surface water control systems.

1. Removed materials and equipment become property of Contractor.

B. Restore areas disturbed by installation and removal of groundwater control systems and observation wells to their original condition.

C. Leave in place deep wells casings, well-points, and observation wells located:

1. Within plan limits of structures or pipelines.
2. Within zone below 1H:1V planes extending downward and out from edges of foundation elements or from downward vertical footprint of pipe.
3. Where removal would result in ground movements causing adverse settlement to adjacent ground surface, utilities, or existing structures.

D. Fill pulled casings holes with sand. Where left in place, fill casings with cement grout and cut off a minimum of 3 feet below finished ground level or 1 foot below foundation level to prevent interference with finished structures or pipelines.

E. When directed by the Engineer, leave observation wells in place for continued monitoring. Cut casings flush with final ground level when directed and provide protective lockable boxes with locking devices. Provide protective boxes suitable for traffic and other conditions to which observation wells will be exposed.

END OF SECTION 312319

SECTION 312333 - TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes trench excavation, backfilling, and compaction.

B. Related Requirements:

1. Section 310515 “Soils and Aggregates for Earthwork” for materials used as backfill and for sheeting and bracing.
2. Section 310519 “Geotextiles for Earthwork” for subsurface drainage geotextiles.
3. Section 312000 “Earthwork” for related earthwork activities.
4. Section 312316 “Rock Removal” for rock and boulder excavation.
5. Section 312319 "Dewatering" for dewatering and drainage.
6. Section 312500 “Erosion and Sedimentation Controls” to prevent erosion, sedimentation, and contamination of adjacent properties.
7. Section 329119 “Landscape Grading”: Filling of topsoil over backfilled trenches to finish grade elevation.
8. Section 333100 “Sanitary Utility Sewerage Piping”: Sanitary sewer piping and bedding from building to utility service.

1.3 DEFINITIONS

A. Percent Compaction: Means at least the stated percentage of maximum density as determined by ASTM D 1557, Method D.

1.4 ACTION SUBMITTALS

A. Submit proposed method of backfilling and compaction prior to start of Work.

B. Submit method of excavation and trench support, where necessary, including design of sheeting and bracing with calculations signed and sealed by qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For material excavated from trench for re-use as backfill, by a qualified testing agency.

1.6 QUALITY ASSURANCE

A. Comply with following regulations:

1. The 2019 State of Rhode Island Building Code.
2. Occupational Safety and Health Administration (OSHA): 29 CFR Part 1926 Subpart P.

B. Provide excavation, trenching, related sheeting, bracing, and related materials to comply with requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P) and State of Rhode Island requirements. Where conflict exists between OSHA and State regulations, more stringent requirements apply.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store excavated materials according to Section 312500 “Erosion and Sedimentation Control” to prevent erosion of soil type materials and contamination of adjacent water sources.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine that erosion and sedimentation controls are in place and comply with project requirements and authorities having jurisdiction.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Where excavation activities occur across active vehicular or pedestrian circulation paths, use temporary controls specified in Division 01 to maintain circulation during operations required by this Section. Maintain temporary controls for each day circulation paths are restricted.

B. Coordinate work of this Section with materials specified in other Sections of Division 31.

C. Identify required lines, levels, contours, and datum locations.

D. Protect features to remain-in-place including benchmarks, existing structures, fences, sidewalks, paving, curbs, etc. from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

3.3 TRENCH EXCAVATION

A. Trench excavation includes material of every description and substance encountered, except rock and boulders. Refer to Section 312316 “Rock Removal” for excavation of those materials.

B. Cut rigid and flexible pavement with a saw, wheel, or pneumatic chisel along straight lines before excavating.

C. Strip and stockpile topsoil from grassed areas crossed by trenches.

1. At Contractor's option when required, topsoil may be disposed of and replaced with approved topsoil of equal quality.

D. While excavating and backfilling is in progress, maintain traffic and protect utilities and other property.

E. Excavate trenches to indicated depths and in widths sufficient and of practical minimum for pipe laying, bracing, and pumping and drainage facilities.

F. Accomplish excavation and dewatering by methods preserving undisturbed state of subgrade soils. Excavate trench by machinery to or just below designated subgrade, if material remaining in trench bottom is no more than slightly disturbed.

1. Remove subgrade soils that become soft, loose, quick, or otherwise unsatisfactory due to inadequate excavation, dewatering, or other construction methods and replace with screened gravel fill acceptable to the Engineer at Contractor's expense.

G. Use care when working in clay and organic silt soils, which are particularly susceptible to disturbance due to construction operations. When excavation is to end in such soils, use a smooth-edge bucket to excavate the last 12 inches of depth.

H. Where pipe is to be laid in screened gravel bedding, excavate trench by machinery to normal depth of pipe, provided material remaining in trench bottom is no more than slightly disturbed.

I. Where pipe is to be laid directly on trench bottom, manually perform final excavation, providing a flat-bottom, true to grade upon undisturbed material. Make bell holes required by project conditions.

3.4 DISPOSAL OF MATERIALS

A. Stack excavated material without excessive surcharge on trench bank or obstructing free access to hydrants and gate valves. Avoid inconvenience to traffic and abutters. Segregated excavated material for use in backfilling as specified below. Also see Article 6.29 of the Special Conditions.

B. Do not remove excavated material from work site, except as directed by the Engineer. When removal of surplus materials is approved by the Engineer, dispose of such surplus material in approved designated areas.

C. Should conditions make it impracticable or unsafe to stack material adjacent to trench, haul and store material at a location provided. When required, re-handled and use it in backfilling trench.

3.5 SHEETING AND BRACING

A. Provide and maintain sheeting and bracing required by Federal, State, or local safety requirements to support sides of excavation and prevent loss of ground which could endanger personnel, damage, adjacent structures, or delay the work.

1. Engineer may order additional supports placed at Contractor's expense if it is determined that at any point sufficient or proper supports have not been provided. Compliance with such order shall not relieve Contractor from their responsibility for sufficiency of such supports. Take care to prevent voids outside of sheeting; if voids are formed, immediately fill and ram them.

B. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support trench sides, take care in placing and moving the boxes or supporting bracing to prevent pipe movement, disturbance of pipe bedding, or screened gravel backfill.

1. Rigid Pipe Installation (such as R.C., V.C., A.C.): Raise that portion of box extending below mid-diameter above this point prior to moving box ahead to install next pipe. Perform to prevent separation of installed pipe joints due to box movement.
2. Flexible Pipe Installation (such as PVC): Do not allow trench boxes, moveable sheeting, shoring, or plates to extend below mid-diameter of pipe. As trench boxes, moveable sheeting, shoring, or plates are moved, place screened gravel to fill voids created. Re-compact screened gravel and backfill to provide uniform side support for pipe.

C. Engineer may give permission to use steel sheeting in lieu of wood sheeting for entire job wherever sheeting use is necessary. Include cost for use of sheeting in bid items for pipe, including full compensation for driving, bracing, and later removal of sheeting.

D. Carefully remove sheeting and bracing in manner to not endanger construction of other structures, utilities, or property, whether public or private. Immediately refill voids left after withdrawal of sheeting using sand by ramming with tools especially adapted to that purpose and watering or otherwise directed by the Engineer.

E. No payment will be given for sheeting, bracing, or other support during progress of the work. No payment will be given for sheeting left in trench for Contractor's convenience.

F. Leave sheeting driven below mid-diameter of pipe in place from driven elevation to at least 12 inches above top of pipe.

3.6 TEST PITS

A. Excavation of test pits may be required for purpose of locating underground utilities or structures as an aid in establishing the precise location of new work.

B. Backfill test pits as soon as desired information has been obtained. Maintain backfilled surface appropriate for travel until resurfaced.

C. Test pits are not a separate bid item and should be included in the costs of work requiring test pits.

3.7 EXCAVATION BELOW GRADE AND REFILL

A. Drain trench completely and effectively be in-the-dry, whatever the nature of unstable material encountered or groundwater conditions.

B. If Contractor excavates below grade through error or for their own convenience, through failure to properly dewater the trench, or disturbs subgrade before dewatering is sufficiently complete, the Engineer may direct Contractor to excavate below grade as set forth in following Paragraph, where work shall be performed at its own expense.

C. If material at trench bottom consists of fine sand, sand and silt or soft earth which may work into the screened gravel, even with effective drainage, remove subgrade material to extent directed. Refill excavation with a 6-inch layer of coarse sand or a mixture graded from coarse sand to fine pea stone to form a filter layer preserving voids in pipe gravel bed. Composition and gradation of gravel shall be approved by the Engineer prior to placement. Place screened gravel in 6-inch layers thoroughly compacted up to normal grade of pipe. If directed by the Engineer, use bank-run gravel for refill of excavation below grade.

D. Subsurface Drainage Geotextile: Non-woven filter fabric as specified in Section 310519 "Geotextiles for Earthwork" may be substituted for filter layer, if approved by the Engineer.

3.8 BACKFILLING

A. Begin backfilling as soon as practicable after laying and jointing pipe and continue expeditiously. Place bedding gravel of specified type for pipe installed up to 12 inches over the pipe.

B. Construct an impervious dam or bulkhead cutoff of clay or other impervious material in the trench, as directed by the Engineer, to interrupt unnatural flow of groundwater after construction is completed. Key dam into trench bottom and sidewalls. Provide at least one clay or other impervious material dam in pipe bedding between each manhole where directed or every 300 feet, whichever is less.

C. Where pipes are laid cross-country, fill remainder of trench with common fill material in layers not to exceed 12 inches and mounded 6 inches above existing grade or as directed by the Engineer. Where a loam or gravel surface exists prior to cross-country excavations, remove, conserve and replace it to full original depth as part of the work under pipe items. Where necessary, remove excess material during clean-up process, so that ground may be restored to its original level and condition.

D. Where pipes are laid in streets, backfill remainder of trench up to a depth of 12 inches below bottom of specified permanent paving with select common fill material in layers not to exceed 12 inches and thoroughly compacted. Use bank-run gravel for subbase layer of paving and compact in 6 inches layers.

E. To prevent longitudinal pipe movement, do not dump backfill material into trench and then spread, until selected material or screened gravel has been placed and compacted to a level at least 12 inches over the pipe.

F. Bring backfill up evenly on all sides. Thoroughly compact each layer of backfill material by rolling, tamping, or vibrating with mechanical compacting equipment or hand tamping to 95 percent compaction according to ASTM D 1557. If rolling, use a suitable roller or tractor being careful to compact fill throughout full width of trench.

G. Do not compact by puddling or water jetting.

H. Use hand or pneumatic ramming with tools weighing at least 20 pounds for compacting in confined areas. Spread and compact material in layers not exceeding 6 inches thick, an uncompacted loose measurement.

I. Use granular fill material as backfill around structures. Spread and compact specified backfill under and over pipes connected to structures.

J. Do not place bituminous paving in backfill. Do not use frozen material under any circumstances.

K. Broom and hose-clean road surfaces immediately after backfilling. Employ dust control measures throughout construction period.

3.9 RESTORING TRENCH SURFACE

A. Where trench occurs adjacent to paved streets, in shoulders, sidewalks, or in cross-country areas, thoroughly consolidate backfill and maintain surface as the work progresses. If settlement takes place, immediately deposit additional fill to restore ground level.

B. In and adjacent to streets, 12 inches of trench backfill below specified initial pavement shall consist of compacted bank-run gravel. If Contractor wants to use material excavated from trench as gravel subbase for pavement replacement, take samples at intervals not to exceed 500 feet of material and test by an independent testing laboratory at Contractor’s expense. Use only materials approved by the Engineer.

C. Restore surface of driveways or other areas which are disturbed by trench excavation to a condition at least equal to that existing before work began.

D. In areas where pipeline passes through grassed areas, remove and replace sod or loam and seed surface at Contractor's own expense.

END OF SECTION 312333

SECTION 312500 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Diversion Channels
2. Rock Energy Dissipator
3. Paved Energy Dissipator
4. Rock Basin
5. Rock Barriers/Check Dams
6. Sediment Fences
7. Construction Entrances
8. Turbidity Curtains
9. Filter Bags
10. Erosion Control Blanket
11. Straw Wattle.

B. Related Sections:

1. Section 310515 “Soils and Aggregates for Earthwork.”
2. Section 311000 “Site Clearing.”
3. Section 312316 “Excavation.”
4. Section 329119 “Landscape Grading.”

1.3 REFERENCE STANDARD

A. EPA document titled: “Stormwater Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices” document number EPA 832-R-92-005, dated 1992, or most recent edition. State or appropriate Conservation Commission standards can be substituted for the EPA standard if the State or Conservation Commission standard is equal to, or more detailed than, the EPA standard.

1.4 ACTION SUBMITTALS

A. Section 013300 “Submittal Procedures”: Requirements for submittals.

1. Submit, within 10 days after award of Contract, technical product literature for all commercial products.

B. Product Data: Product Data: Submit data on geotextiles and other sedimentation and erosion control products.

C. Submit proposed mix design for review prior to commencement of Work.

D. Samples:

1. Submit two samples or rock, minimum 5 tons each or one-half total project quantity, whichever is smaller. Provide one sample in place at construction site and provide other sample at quarry. Construction site sample may be incorporated into the Work. Samples will be used as reference for judging size, and graduation of rock supplied and placed.

E. Test Reports: Indicate certified tests results for granular backfill.

F. Certificate: Certified statement as specified in "Erosion Control Blanket" Article.

1.5 INFORMATIONAL SUBMITTALS

A. Stormwater Pollution Prevention Plan (SWPPP) as specified in "Quality Assurance" article.

B. Copy of EPA NPDES Notice of Intent to Discharge submitted to the EPA as specified in "Quality Assurance" article.

1.6 CLOSEOUT SUBMITTALS

A. Section 017700 "Closeout Procedures": Requirements for submittals.

1.7 QUALITY ASSURANCE

A. Prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the U.S. Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) General Permit applicable to this work) document number EPA 832-R-92-005, dated 1992, or most recent edition.

B. Prepare and submit the EPA NPDES Notice of Intent to Discharge to the applicable EPA office in accordance with EPA regulations.

C. Perform Work in accordance with requirements of Section 310515, Section 311000, Section 312316, Section 329119.

D. Perform Work according to RIDOT Bluebook standards.

1.8 PRE-INSTALLATION MEETINGS

A. Section 013100 "Project Management and Coordination": Pre-installation meeting.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not place grout when air temperature is below freezing.

B. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

A. Materials and Resources Characteristics:

1. Recycled Content Materials: Furnish materials with maximum available recycled content.

2.2 ROCK AND GEOTEXTILE MATERIALS

A. Furnish materials according to RIDOT Bluebook standards.

B. Geotextile Fabric: Furnish according to RIDOT Bluebook standards.

2.3 BLOCK, STONE, AGGREGATE, AND SOIL MATERIALS

A. Coarse Aggregate: As specified in Section 310515 “Soils and Aggregates for Earthwork.” Furnish according to RIDOT Bluebook standards.

B. Soil Backfill: As specified in Section 310515 “Soils and Aggregates for Earthwork.”

2.4 SILT FENCE

A. Silt fence filter fabric shall be a woven, polypropylene, ultraviolent resistant material as specified in Section 310519 “Geotextiles for Earthwork.”

B. Products: Provide one of the following:
1. “Mirafi FW402,” by TenCate Geosynthetics
2. “Carthage 15%,” by Carthage Mills
3. “HSP2.” by ACF Environmental, Inc.
4. Or equal.

C. Sediment fence shall be a prefabricated commercial product made of a woven, polypropylene, ultraviolet resistant material such as “Envirofence” by Mirafi Inc., Charlotte, NC or equal.

2.5 TURBIDITY CURTAIN

A. Barrier Material: filter fabric.

B. Barrier height shall be 20 percent greater than the depth of water.

2.6 FILTER BAGS

A. Filter Bags: Sized with manufacturer recommendations based on pumped discharge rate.

B. Geotextile Material for Bags: Meet the following minimum requirements:

Minimum Grab Tensile Strength	200 lbs
Minimum Grab Tensile Elongation	50%
Minimum Trapezoidal Tear Strength	80 lbs
Mullen Burst Strength	380 psi
Minimum Puncture Strength	130 lbs
Apparent Opening Size	40-80 US Sieve
Minimum Flow Through	70 gpm/square foot

C. Bag shall have opening large enough to accommodate 4 inch diameter discharge hose.

2.7 EROSION CONTROL BLANKET

A. Erosion control blankets: 100 percent agricultural straw fiber matrix, 0.5 lbs / sq yd, stitch bonded with degradable thread between two photodegradable polypropylene nettings.

1. Product: Provide Model S150 Double Net Short-Term Blanket (12 months) by North American Green, Evansville, IN), or equal.

B. Prior to start of work, provide a certified statement as to the number of pounds materials to be used per 100 gallons of water. Specify the number of square feet of seeding that can be covered with the quantity of solution in the Contractor's hydroseeder.

2.8 STRAW WATTLE

A. Straw Wattle: Prefabricated commercial product with outside casing made up of organic hessin.

1. Effective Height: 12 inches plus or minus 1 inch.
2. Effective Circumference: 3 38 inches.

B. Product: Provide products by Phase II Stormwater Products Wrentham MA or equal.

C. Section 014000 “Quality Requirements”: Testing, inspection and analysis requirements.

D. Perform tests on cement, aggregates, and mixes to ensure conformance with specified requirements.

E. Test samples in accordance with ACI 301.

F. Allow witnessing of inspections and test at manufacturer's test facility. Notify Engineer at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017300 – "Execution": Verification of existing conditions before starting work.

B. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.

C. Verify gradients and elevations of base or foundation for other work are correct.

3.2 DIVERSION CHANNELS

A. Windrow excavated material on low side of channel.

B. Compact to 95 percent maximum density.

3.3 SILT FENCE

A. Position sediment fences as required to prevent off site movement of sediment produced by construction activities as directed by the Engineer. Areas beyond limits of silt fence shall be undisturbed or stabilized.

B. Dig trench approximately 6 inch wide and 6 inch deep along proposed fence lines.

C. Drive stakes, 10 feet on center (maximum) at back edge of trenches. Drive stakes 2 feet (minimum) into ground.

D. Hang filter fabric on posts carrying to bottom of trench with about 4 inches of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and maintain secure both ways.

E. Backfill trench with excavated material and tamp.

F. Install prefabricated silt fence according to manufacturer's instructions.

3.4 CONSTRUCTION ENTRANCE

A. Construct entrance with minimum of 6 inch of course aggregate at all points of ingress/egress.

B. Width: Minimum 20 feet, increased as needed for typical construction vehicles.

C. Minimum Length: 50 feet (15.2 m) (where soils are coarse grained).

D. Install filter fabric below aggregate.

E. Maintain entrance throughout construction, adding more aggregate or increasing length as needed.

3.5 TURBIDITY CURTAIN

A. Install turbidity curtain parallel to bank, extending beyond lateral limits of construction.

B. Install weights at 10 foot intervals, floats at 5 feet intervals.

C. Inspect turbidity curtain daily and repair/replace worn/torn areas as needed.

D. At end of construction, remove accumulated sediment by hand before removing the turbidity curtain.

3.6 FILTER BAG

A. Locate filter bag at least 50 feet from all wetlands, streams or other surface waters.

B. Install bag on a vegetated filter strip to allow water to flow in all directions.

C. Bag is full when remaining flow area is reduced by 75%. Replace full bags with new bags.

3.7 EROSION CONTROL BLANKETS

A. Install erosion control blankets onto all exposed slopes to be loamed and seeded that are steeper than 4(Horizontal) to 1(Vertical) as required. Erosion control blankets shall also be installed in all seeded drainage swales and ditches, and as directed by the Engineer in accordance with manufacturer's instructions.

B. The area to be covered shall be properly prepared, fertilized and seeded with permanent vegetation before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow and stapled.

C. Place blankets and stapled together in accordance with manufacturer's instructions. Side overlaps shall be 4-inch minimum. The staples shall be made of wire, 0.091 inch in diameter or greater, "U" shaped with legs 10-in in length and a 1-1/2-in crown. Commercial biodegradable stakes may also be used with prior approval by the Engineer. The staples shall be driven vertically into the ground, spaced approximately two linear feet apart, on each side, and one row in the center alternately spaced between each size. Upper and lower ends of the matting shall be buried to a depth of 4-in in a trench. In swales and ditches, erosion stops shall be created every 25-ft by making a fold in the fabric and carrying the fold into a silt trench across the full width of the blanket. The bottom of the fold shall be 4-in below the ground surface. Staple on both sides of fold. Where the matting must be cut or more than one roll length is required in the

swale, turn down upper end of downstream roll into a slit trench to a depth of 4-in. Overlap lower end of upstream roll 4-in past edge of downstream roll and staple

D. To ensure full contact with soil surface, roll matting with a roller weighing 100 lbs/ft of width perpendicular to flow direction after seeding, placing matting and stapling. Thoroughly inspect channel after completion. Correct any areas where matting does not present a smooth surface in full contact with the soil below.

3.8 STRAW WATTLE

A. Position straw waddles as necessary to prevent off site movement of sediment produced by construction activities as directed by the Engineer.

B. Drive wooden stakes, 5 feet on center (maximum) at back edge of waddle. Drive stakes 2 feet (minimum) into ground.

C. Install prefabricated straw waddle according to manufacturer's instructions.

3.9 SITE STABILIZATION

A. Incorporate erosion control devices as required into the Project at the earliest practicable time.

B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2: 1 or flatter.

D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.10 FIELD QUALITY CONTROL

A. Section 014000 "Quality Requirements": Field inspecting, testing, adjusting, and balancing.

B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

C. Compaction Testing: In accordance with ASTM D1557.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

E. Frequency of Compaction Testing: One for each lift.

3.11 CLEANING

A. Section 017300 “Execution” and 017700 “Closeout Procedures”: Requirements for cleaning.

B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.

C. Do not damage structure or device during cleaning operations.

D. Do not permit sediment to erode into construction or site areas or natural waterways.

E. Clean channels when depth of sediment reaches approximately one half channel depth.

3.12 PROTECTION

A. Section 017300 “Execution”: Requirements for protecting finished Work.

B. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.

C. Do not permit construction traffic over paving for 7 days minimum after finishing.

D. Protect paving from elements, flowing water, or other disturbance until curing is completed.

END OF SECTION 312500

SECTION 313211

SEDIMENT AND EROSION CONTROL MEASURES

PART 1 GENERAL

1.01 SCOPE

A. The Work under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction sediment and control measures.

B. General

1. All erosion and sediment control measures are to be placed prior to any disturbance caused by grading and or excavation and shall conform to the requirements of the appropriate regulatory agency for the State.

2. The Contractor shall be solely responsible for ensuring that erosion and sediment control measures are implemented and maintained at the site.

3. Soil disturbing activities include but are not limited to excavation for drainage, sediment forebay, sand filter, and bioretention filter construction, grading, and preparation for final seeding.

1.02 RELATED WORK

A. 321000 – EARTH MOVING.

B. 310519.13 – GEOTEXTILE FABRIC.

PART 2 PRODUCTS

2.01 MATERIALS

A. Synthetic Filter Fabric for silt fences:

1. Erosion control fabric shall conform to Section 310519.13 – GEOTEXTILE FABRICS.

B. Support Posts: 4 foot - 2 x 2 wood.

C. Straw Bales:

1. Oat or wheat straw, free from weeds, viable weed seeds, foreign matter detrimental to plant life, and dry.

a. Grass hay bales are not acceptable.

b. In order to prevent deterioration of the bindings, all bales shall be either wire-bound or string-tied so that bindings are oriented around the sides rather than along the tops and bottoms of the bales.

D. Silt Sack Inlet Protection

1. Silt Sack shall be submitted to the Engineer for approval.

E. Filter Sock

1. Filter sock shall be Filtrexx Filter Soxx 18” Diameter or approved equal. Submit to the Engineer for approval.

F. Turbidity Barrier

1. Turbidity Barrier shall be AER-FLO Tough-Guy Floating Turbidity Barrier Type 2. DOT, or approved equal.

2. Install in accordance with manufacturer recommendations and at locations designated on the plans.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Install filter soxx, or approved equal, at local drainage ways to prevent silt intrusion upon adjacent drainage courses. Remove filter soxx following establishment of vegetation cover and utilize mulch/compost in filter soxx at swales or on steep slopes.

B. Prior to construction, install filter soxx, or approved equal, along the downhill construction limits in accordance with the erosion control standard detail to prevent silt intrusion upon adjacent land.

C. Install sediment and erosion control measures on the down slope toe of all topsoil stockpiles.

D. Install silt sack at all catch basins within the vicinity of construction.

E. Install Turbidity Barrier as designated on the plans.

F. Maintain and remove all erosion controls as specified.

G. Temporary seeding shall be placed on exposed surfaces that will not be brought to final grading or permanent cover treatment within thirty (30) days of the exposure to reduce erosion and sedimentation by stabilizing exposed soils. Seeded areas shall be checked regularly for bare spots, washouts, and healthy growth to assure that a good stand of grass is being maintained. Re-seed areas that fail to establish vegetation cover as soon as such areas are identified.

3.02 DUST CONTROL

A. In areas subject to surface and air movement of dust, where on-site or off-site damage is likely to occur, one or more of the following preventive measures shall be taken for dust control:

1. Minimize the period of soil exposure through the use of temporary ground cover and other temporary stabilization practices.

2. Sprinkle the site with water until surface is wet. Repeat as needed.

3.03 SILT FENCE

A. Silt fences are appropriate for the following general locations:

1. Immediately upstream of the point(s) of runoff discharge from a site before flow becomes concentrated.

2. Below disturbed areas where runoff may occur in the form of overland flow.

3. Along the down slope toe of all topsoil stock piles.

B. Materials

1. Utilize filter fabric in accordance with Section 310519.13– GEOTEXTILE FABRICS. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum six (6) inch overlap, and securely sealed.

2. Filter fabric shall be stapled or wired to the fence and six (6) inches of the fabric shall be extended into the ground. Filter fabric shall not be stapled to existing trees.

3. Support posts shall be spaced at a maximum six (6) feet and driven securely into the ground a minimum of twenty-four (24) inches.

4. The height of a silt fence shall not exceed thirty-six (36) inches. Higher fences may impound volumes of water sufficient to cause failure of the structure.

C. Maintenance

1. Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.

2. Silt fences shall be inspected for depth of sediment, tears, and to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground. Any deficiencies shall be repaired immediately.

3. Should the fabric on a silt fence of filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

4. Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/3 the height of the barrier or when the sediments limit or prevent the flow of water through the fabric hydraulic.

5. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

3.04 STRAW BALE EROSION CONTROL FENCE

A. Straw bale erosion control fences are appropriate for the following general locations:

1. Sheet flow applications: Straw bales shall be placed in a single row, lengthwise on the contour with ends of adjacent bales tightly abutting one another.

2. Channel flow applications: Straw bales shall be placed in a single row, lengthwise and oriented perpendicular to the direction of flow with ends of adjacent bales tightly abutting one another. The barrier shall be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment laden runoff will flow either through or over the barrier but not around it.

B. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of four (4) inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. Backfill shall conform to the ground level of the

downhill side and shall be built up to four (4) inches against the uphill side of the barrier.

C. Each bale shall be securely anchored by at two (2) stakes or rebar driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or rebar shall be driven a minimum of twelve (12) inches into the ground or deep enough into the ground to securely anchor the bales, whichever is greater.

D. The gaps between bales shall be chinked (filled by wedging with straw to prevent water from escaping between the bales). Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency.

E. MAINTENANCE

1. Inspection shall be frequent, and repair or replacement shall be made promptly as needed.

3.05 FILTER SOCK

A. Filter sock is appropriate for the following general locations:

1. Sheet flow and low concentrated flow applications.

2. Above and below disturbed areas and erodible slopes.

3. Along the down slope toe of all topsoil stock piles.

4. On frozen ground or paved surfaces.

B. Materials

1. Materials shall be submitted to the Engineer for approval.

C. Installation

1. Installation of filter sock shall be strictly in accordance with the manufacturer's instructions and specific layout plans and details reviewed by the Engineer.

D. Maintenance

1. Filter sock shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.

2. Should the sediment control become damaged or ineffective prior to the end of the expected usable life and the barrier still be necessary, the control shall be repaired or replaced promptly.

3. Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/2 the height of the barrier or when the sediments limit or prevent the flow of water through the barrier.

4. Any sediment deposits remaining in place after the filter sock is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

END OF SECTION 313211

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes temporary excavation and trench support and protection systems.

B. Related Requirements:

1. Section 014000 “Quality Requirements” for testing and laboratory services.
2. Section 312000 "Earthwork" for excavating and backfilling.
3. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
4. Section 312316 “Rock Removal” for excavation of rock and boulders.
5. Section 312319 "Dewatering" for lowering and disposing of ground water during construction and dewatering excavations.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review existing utilities and subsurface conditions.
2. Review coordination for interruption, shutoff, capping, and continuation of utility services.
3. Review proposed excavations.
4. Review proposed equipment.
5. Review monitoring of excavation support and protection system.
6. Review coordination with waterproofing.
7. Review abandonment or removal of excavation support and protection system.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For excavation support and protection system, prepared by or under the supervision of a qualified professional engineer, meeting the minimum performance requirements in Part 2 of this Section.

1. Include overall system plan, indicating clearances, dimensions, material properties, member sizes, locations, spacing and member penetrations depths, and locations of various types of lateral supports.

2. Show details, layout, arrangement, equipment requirements, and method of construction of proposed excavation support system.
3. Indicate existing and proposed utilities, structures or other obstructions.
4. Show wall elevations and locations of bracing.
5. Show overall installation sequence and removal of bracing. Indicate work levels to be performed before bracing is installed or removed.
6. Method of preloading bracing, if required, including preload for each member, and method of locking-off the preload. Submit detailed drawings of connections, jacking supports, and method of shimming.
   Include procedures for resolving difficulties arising from misalignment of members exposed during excavation and criteria for implementing those procedures. n.

B. Design Calculations: For excavation support and protection system. Include analysis data prepared, signed, and sealed by professional engineer responsible for their preparation.

1. Include loads on excavation support system for all stages of excavation, bracing removal, and concrete placement, including material and equipment loads on adjacent ground during construction.
2. Include design of wall and bracing members including details for all construction stages.
3. Include theoretical deflections of excavation support system and deformation of structures, pipelines, and other improvements located within areas influencing excavations.

C. Submit to the Engineer for review and acceptance, a plan of action to be implemented in the event any deformation threshold value is reached. Identify positive measures in action plan to further limit wall movement, including but not limited to trenching for struts and wales, placement of granular earth berms against the wall, installation of additional struts, or combinations thereof.

1. Include description and details of mitigating measures, work schedule, location and availability of materials, and structural details for connections to wall and support elements.
2. Be prepared to work 24 hours per day to implement such measures.
3. Perform remedial work and mitigating measures at no additional cost to OWNER.

1.5 INFORMATIONAL SUBMITTALS

A. Submit quality control measures to ensure that performance of excavation support system complies with project requirements.

B. Submit welder qualifications and weld procedures in accordance with AWS D1.1.

C. Maintain at least one copy of design at job site during excavation that includes a plan indicating sizes, types, and configurations of the materials to be used in protective system. Identity registered Contractor’s design engineer who stamped the design.

D. Do not proceed with excavation support or protection activities until submittals have been approved by the Engineer.

E. Submit inspection documentation:

1. On-site inspections of excavation support system as the systems are constructed.
2. Review of quality control measures and performance data.
3. Certification that excavation support system is constructed per applicable design following completion of each support system and following Contractor modifications during construction.

1.6 QUALITY ASSURANCE

A. Contractor Qualifications: Minimum 5 years' experience compatible to indicated Work, and who employs labor and supervisory personnel similarly experienced in Work of this Section.

B. Contractor's Design Engineer: Registered Professional Engineer in State of Rhode Island where the work is located with at least 5 years' professional experience in design and construction of support of excavation systems and having completed a minimum of 5 successful excavation support projects of equal type, size, and complexity to specified work.

C. Existing Conditions: Using photographs, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

D. Regulatory Requirements: Comply with authorities having jurisdiction, including OSHA requirements.

E. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.7 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Contact utility companies and other responsible authorities to locate and mark underground utilities.
2. Notify the Engineer no fewer than two days in advance of proposed interruption of utility.
3. Do not proceed with interruption of utility without the Engineer's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads within specified movement criteria.

1. Contractor Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.

2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems to minimize horizontal and vertical movements without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

B. Do not permit excavations below the level of the base of adjacent existing foundations or retaining walls, unless excavation design and bracing includes an analysis of stability of structure supported by foundation and if necessary, incorporates required bracing or underpinning of foundation.

C. For support systems in which bracing is installed between opposite sides of the excavation, design excavation support of both sides to be nearly the same as feasible.

D. Where necessary to resist point loads, fill pipe piles used as soldier piles with concrete. Do not consider concrete strength in design of pipe pile for bending stress.

E. Design, install, operate, and maintain ground water control system to control ground water inflows, prevent piping or loss of ground, and maintain stability of the excavation. Refer to the requirements of Section 312319 “Dewatering.”

F. Design review and field monitoring activities by OWNER or the Engineer does not relieve Contractor of its work responsibilities.

2.2 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Steel Liner Plates: ASTM A1101, structural quality hot-rolled carbon steel sheets or plates of either the two- or four-flange type, punched for bolting on all sides. Space bolts according to manufacturer’s standards and be multiples of plate length, so members having same curvature are interchangeable with bolt numbers and patterns determined by liner supplier.

1. Tensile Strength: 42,000 psi.
2. Yield strength: 28,000 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that instrumentation required is installed and initialized prior to start of work required by this Section.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Obtain permits from local authority having jurisdiction prior to initiating excavation work.

B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

C. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
2. Install fencing, gates, lights, and signs around excavations and staging areas to provide for public safety.

D. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.3 GENERAL

A. Install excavation support systems in accordance with the shop drawings and applicable permits.

B. Fill voids between excavation support system and earth with materials acceptable to the Engineer.

C. If unstable material is encountered during excavation, take immediately measures to contain it in place and prevent ground displacement.

D. If settlement or deflections of supports indicate that support system requires modification to prevent excessive movements, redesign and resubmit revised shop drawings and calculations to the Engineer without additional compensation.

E. Maintain sufficient quantity of material on site for protection of work and for use in case of accident or emergency.

3.4 PORTABLE TRENCH BOXES

A. Use portable trench boxes or sliding trench shields only for worker protection.

B. Additional excavation, backfilling, and surface restoration required as result of trench box use shall be provided without additional compensation.

C. Design, construct, and maintain trench boxes or shields to meet acceptable engineering and industry standards.

D. Install shields in a manner to restrict lateral or other hazardous movement of the shield in the event of sudden lateral loads.

E. Maintain a written copy of trench box manufacturer's specifications, recommendations, and limitations at job site during excavation work.

3.5 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation.

1. Install using impact hammer or vibratory hammer in predrilled holes.
2. Soldier Piles in Predrilled Holes:

    a. Provide casing or other methods of support to prevent caving of holes and loss of ground.
    b. Backfill with concrete from elevation of bottom excavation to pile tip elevation. Backfill remainder of predrilled hole with lean concrete or sand.
    c. Predrilled hole of sufficient diameter allowing for proper alignment and concrete backfilling of pile.

3. Install driven piles with driving shoes where hard driving is anticipated.
4. Advance driven soldier piles without aid of a water jet.

B. Extend soldier piles below excavation grade level to depths shown on reviewed Shop Drawings. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

C. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging.

1. Install lagging so ground loss does not occur between adjacent or below lowest board. As excavation proceeds, do not maximum height of 4 feet for unlagged face of excavation.
2. Do not exceed unlagged face of 2 feet if water seeps or flows from excavation face or excavation face becomes unstable.

D. Fill voids behind lagging with soil, and compact.

E. Install wales at locations as required and secure to soldier piles.

3.6 STEEL SHEET PILING

A. Thoroughly cleaned and inspect sheet piles for defects and proper interlock dimensions prior to installation. Provide a tool for checking interlock dimensions.

B. Before starting excavation, drive one-piece sheet piling lengths in plumb position and tightly interlock vertical edges for its entire length to form a continuous barrier. Form a continuous diaphragm throughout length of each run of wall, bearing tightly against original ground.

1. Exercise care in driving so interlocking members can be extracted without damaging adjacent structures or utilities.
2. Use driving, cutting, and splicing methods conforming to approved Shop Drawings.
3. Use templates or other temporary alignment facilities to maintain piling line.

C. Accurately place piling, using templates and guide frames unless otherwise recommended in writing by sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 5 feet.

D. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

E. Install each sheet pile having sufficient clearance in interlocks to slide under its own weight into interlock of previously placed sheet pile.

F. Do not excavate in advance of steel sheet piling installation.

G. Where obstructions are anticipated, pre-excavate or pre-drill along sheet pile wall alignment without additional compensation. Do not extend pre-excavation and pre-drilling below lowest excavation level or into bearing soils for existing or future structures.

H. Remove obstructions encountered before the specified embedment for piles. Where obstructions cannot be removed, re-evaluate sheet pile system by Contractor's design Engineer show reduced embedment and additional toe stability measures to be implemented for sheet pile wall realignment. Submittal proposed design measures to the Engineer for review.

I. Withdraw damaged or faulty aligned pilings with provide new piling, driven properly in its place without additional compensation.

J. Cut tops of sheet piling to uniform elevation at top of excavation.

3.7 LINER PANELS

A. Install liner plates as soon as excavation has progressed sufficiently to install next complete circumferential ring of liner plates. Complete ring of liner plates prior to continuing excavation.

1. Do not install more than one ring of liner plates at any time.

B. Stagger plates in vertical direction to facilitate shaft strength and leakage resistance.

C. Grout liner plates in accordance with approved Shop Drawings.

3.8 INTERNAL BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by the Engineer.
2. Install internal bracing if required to prevent spreading or distortion of braced frames.

3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

B. Provide internal bracing to carry maximum design load without distortion or buckling.

C. Include web stiffeners, plates, or angles required to prevent rotation, crippling, or buckling of connections and points of bearing between structural steel members. Allow for eccentricities caused by field fabrication and assembly.

D. Install and maintain bracing support members in tight contact with each other and with the surface being supported. Do not use wood shims.

E. Coordinate excavation work with installation of bracing. Extend excavation no more than 2 feet below any brace level prior to installation of the bracing.

F. Use procedures that produce uniform loading of bracing member without eccentricities, overstressing, or distortion of system members.

3.9 REMOVAL

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
2. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earthwork."
3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Do not remove vertical support members that were installed within zone of influence of new or existing structures. Cut off support members installed within this zone at 5 feet below finished grade and abandon in place.

C. Do not remove internal bracing or transfer loads to permanent structure without prior acceptance of the Engineer.

D. Begin removal at excavation bottom and progress upward. Slowly release members noting indication of possible failure of remaining members or possible cave-in of excavation sides.

E. Progress backfilling together with removal of support systems from excavations.

F. Remove all portions of excavation support, unless otherwise indicated by approved Shop Drawings.

1. Zone of Influence Definition: Zone extending down and away from outer edge of the structure at 1 horizontal to 1 vertical.

G. Do not leave untreated wood as part of abandoned portion of the work.

H. When removing excavation support system, do not disturb or damage adjacent buildings, structures, waterproofing material, or utilities. Fill voids immediately with lean concrete or well-graded cohesionless sand or as directed by the Engineer.

I. Immediately remove excavation support system material from site.

END OF SECTION 315000

SECTION 321123 - AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Aggregate subbase.
2. Aggregate base course.

B. Related Sections:

1. Section 321216 “Asphalt Paving,” Base, Binder and Surface courses.

1.3 ACTION SUBMITTALS

A. Section 013300 “Submittal Procedures”: Requirements for submittals.

B. Product Data:

1. Submit data for geotextile fabric and herbicide.
2. Submit subbase aggregate material test reports

    a. AASHTO T27 and T11 Gradation
    b. AASHTO T96 L.A. Abrasion Test

C. Samples: Submit, in air-tight containers, 10 lb sample of each type of aggregate fill to testing laboratory.

D. Materials Source: Submit name of aggregate materials suppliers.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform Work according to RIDOT Bluebook standards.

C. Maintain one copy of each document on site.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Materials and Resources Characteristics:

1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site

2.2 MATERIALS

A. Subbase Aggregate: Bank Run Gravel, meeting the requirements of RIDOT Standard Specifications for Road and Bridge Construction Part 300 Aggregate and Gravel Base and Subbase Courses.

B. Aggregate Quality Requirements

1. Aggregate for base and subbase, shall meet the requirement of the RIDOT Standard Specifications for Road and Bridge Construction Part 300 Aggregate and Gravel Base and Subbase Courses.

C. Fine aggregate:

1. Fine Aggregate shall meet the requirement of the RIDOT Standard Specifications for Road and Bridge Construction Part 300 Aggregate and Gravel Base and Subbase Courses.

2.3 INITIAL TESTS

A. Perform all following tests on the proposed material to demonstrate that it meets all specified requirements when furnished. Submit the initial test results to the Engineer for approval prior to commencement of construction.

1. Sieve Analysis
2. Liquid limit and plasticity index.
3. Moisture-density relationship.
4. Wear Resistance to Degradation (ASTM C131/C131M)

B. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Clean the underlying course or subgrade of all foreign substances prior to constructing the subbase base course(s).

B. Do not construct base/subbase course(s) on underlying course or subgrade that is frozen.

C. Prepare the surface of the underlying course or subgrade to meet specified compaction and surface tolerances.

D. Correct ruts or soft yielding spots in the underlying courses.

E. Correct areas having inadequate compaction, and deviations of the surface from the specified requirements:

1. Loosen and remove soft or unsatisfactory material and add approved material.
2. Reshape to line and grade.
3. Recompact to specified density requirements.

F. For cohesionless underlying courses or subgrades containing sands or gravels:

1. Stabilize the surface prior to placement of the base course(s):

a. Mix aggregate into the underlying course.
b. Compact by approved methods.
c. Do not allow traffic or other operations to disturb the finished underlying course.
d. Maintain underlying course until the base course is placed.

G. Verify that the underlying surface has been inspected, gradients and elevations are correct.

3.2 FABRICATION

A. Install geotextile fabric over subgrade according to manufacturer's instructions.

1. Lap ends and edges minimum 6 inches.
2. Anchor fabric to subgrade when required to prevent displacement until aggregate is installed.

B. Place aggregate equal thickness layers to total compacted thickness within 1/2 inch (13 mm) of the thickness indicated on the drawings or scope of work.

1. Maximum lift Compacted Thickness: 6 inches.

C. Level and compact the base and subbase course to within 1/2 inch of the thickness indicated.

D. Degree of Compaction:

1. Compact aggregate lifts to 95 percent of laboratory maximum dry density.
2. Except as noted below, degree of compaction is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557.
3. The degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch (19.0 mm) sieve will be expressed as a percentage of the laboratory maximum dry density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224.

E. Maintain optimum moisture content of material as necessary to achieve the specified degree of compaction.

3.3 ERECTION TOLERANCES

A. Section 014000 “Quality Requirements”: Tolerances.

B. Maximum Variation From Flat Surface: 1/4 inch measured with 10 foot straight edge.

C. Maximum Variation From Thickness: 1/4 inch.

D. Maximum Variation From Elevation: 1/2 inch.

3.4 FIELD QUALITY CONTROL

A. Section 014000 “Quality Requirements” and Section 017300 “Execution”: Field inspecting, testing, adjusting, and balancing.

B. Field Density Measurements: Measure field density in accordance with ASTM D1556/D1556M, ASTM D2167 or ASTM D6938.

C. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

D. Frequency of Tests: One test for every 1000 square yards of each layer compacted aggregate.

END OF SECTION 321123

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section. The City of Providence standard details in Appendix D apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Asphalt materials.
2. Aggregate materials.
3. Aggregate subbase.
4. Asphalt paving base course, binder course, and wearing course.
5. Asphalt paving overlay for existing paving.
6. Surface slurry.

B. Related Sections:

1. Section 321123 – "Aggregate Base Courses": Compacted subbase for paving.
2. Section 321723 – "Pavement Markings": Painted pavement markings, lines, and legends.

1.3 SUBMITTALS

A. Section 013300 – "Submittal Procedures": Requirements for submittals.

B. Product Data:

1. Submit product information for asphalt and aggregate materials.
2. Submit mix design with laboratory test results supporting design.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Mixing Plant: Conform to RIDOT Bluebook standards.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum 5 years

documented experience.

1.6 AMBIENT CONDITIONS

A. Do not place asphalt mixture between December 15 and April 15, all weather dependent and in accordance with RIDOT specs.

B. Do not place asphalt mixture when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

1.7 REFERENCE STANDARDS

A. Except as otherwise specified herein, the current Rhode Island, Department of Transportation Standard Specifications for Road and Bridge Construction, shall apply to materials and workmanship required for the work of this Section.

B. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO M144 - Standard Specification for Calcium Chloride.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

D. Furnish all labor, material, equipment and incidentals required to cold plane where shown in contract drawings and/or directed by the OWNER.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Calcium chloride shall conform to AASHTO M144, Type I or Type II.

B. Initial trench width pavement shall be Binder Course (Class 12.5 or 19mm), conforming to the referenced specification, Section M3.11, Class I, type I-1 bituminous concrete.

C. Manhole pavement shall be Binder Course and Top Course, conforming to the referenced specification, Section M3.11, Class I, type I-1 bituminous concrete.

D. Manhole pavement shall be Binder Course and Top Course (Class 9.5 mm), conforming to the referenced specification, Section M3.11, Class I, type I-1 bituminous concrete.

E. Final trench pavement shall Binder Course and Top Course conforming to the referenced specification, Section M3.11, Class I, Type I-1, bituminous concrete.

F. Asphalt-Fiber compound shall be mixed at a rate of 6-8% fiber weight to weight of asphalt cement. This compound having the same chemical base provides compatibility and exhibits excellent bond strengths. The fiber functions to re-distribute high stress and strain

concentrations that are imposed on the sealant by thermal sources, traffic loading, etc.

G. Tack coat shall conform to Rhode Island, Department of Transportation Standard Specifications for Road and Bridge Construction.

H. Crack sealer shall be an asphalt-fiber compound designed especially for improving strength and performance of the parent asphalt sealant.

1. Asphalt Sealant shall be a grade PG 58-28 (formerly AC-10), PG 64-22 or PG 64-28 (formerly AC-20) with a penetration of 75-100.

2. Fiber reinforcing materials shall be short-length polyester fibers having the following properties.

Length---------- 7 mm.
Diameter---------- 0.0008 inch plus or minus 0.0001 inch
Specific Gravity -------- 1.32 to 1.40
Melt Temperature------- 480 degrees F. minimum
Ignition Temperature--- 1000 degrees F. minimum
Tensile Strength---------- ,000 PSI plus or minus 5,000 PSI
Break Elongation--------33% plus or minus 9%----They are fully drawn

PART 3 - EXECUTION

3.1 SUSTAINABILITY CHARACTERISTICS

A. Recycled content shall be in conformance with RIDOT Bluebook standards.

3.2 ASPHALT PAVING

A. Performance / Design Criteria:

1. Paving: Design for residential streets and main street arteries.

B. Asphalt Materials:
1. Asphalt Binder: In accordance with RIDOT Bluebook standards.
2. Tack Coat: In accordance with RIDOT Bluebook standards.

C. Aggregate Materials:

1. Coarse Aggregate: In accordance with RIDOT Bluebook standards.
2. Fine Aggregate: In accordance with RIDOT Bluebook standards.
3. Mineral Filler: In accordance with RIDOT Bluebook standards.

D. Aggregate Subbase: Specified in Section 321123 “Aggregate Base Courses”

E. Pavement reclaimed as base course should be in accordance with RIDOT Bluebook standards.

3.3 MIXES

A. Use dry material to avoid foaming. Mix uniformly.

B. Asphalt Paving Mixtures: in accordance with RIDOT Bluebook standards.

C. Asphalt Paving Mixtures: Designed in accordance with RIDOT Bluebook standards.

3.4 ACCESSORIES

A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.

B. Sealant: ASTM D6690, Type II or Type III; hot applied type.

3.5 SOURCE QUALITY CONTROL

A. Section 014000 – "Quality Requirements": Testing, inspection and analysis requirements.

B. Submit proposed mix design of each class of mix for review prior to beginning of Work.

3.6 EXAMINATION

A. Section 017300 "Execution": Requirements for installation examination.

B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.

C. Verify compacted subgrade subbase is dry and ready to support paving and imposed loads.

D. Verify gradients and elevations of base are correct.

E. Verify gutter drainage grilles and frames and manhole frames are installed in correct position and elevation.

F. Streets, driveways, parking areas, sidewalk pavements, brick pavers or curbs damaged or disturbed by the Contractor's operations shall be repaired, replaced or restored in accordance with the requirements specified herein and as directed for the respective type of pavement replacement and in a manner satisfactory to the OWNER.

G. New pavement shall consist of initial pavement over trenches and final bituminous concrete pavement placed over the trench. Paving around manholes shall consist of binder course and top course.

3.7 PREPARATION

A. Prepare subbase in accordance with RIDOT Bluebook standards.

3.8 INITIAL TRENCH WIDTH PAVING IN CITY STREETS

A. Initial trench width pavement shall be placed wherever existing pavement has been removed or disturbed as soon as practical, but in no case more than one week after backfilling is completed.

1. Existing paving shall be mechanically cut outside the trench limits on both sides.
2. The bank-run gravel subbase shall be excavated to a depth of 2-in below the existing pavement, shaped and compacted.
3. Hose clean all road surfaces adjacent to the trench area to be paved. No paving is to be placed until subsurface is dry.
4. Prior to laying the pavement, trimmed edges shall be stable and unyielding, free of loose or broken pieces and all edges shall be thoroughly swept and coated with an asphalt tack coat.
5. The initial trench-width pavement, 2-in, shall be placed and compacted by steel-wheeled rollers of sufficient weight (not less than 240 pounds per inch of tread) to thoroughly compact the bituminous concrete without damaging the existing pavement. The new pavement shall be rolled smooth and even with the existing pavement.
6. Initial pavement shall be maintained in a condition suitable for traffic until replaced or overlaid by final pavement. Defects shall be repaired within 3 days of notification of such defects.
7. Apply temporary pavement markings on streets where existing markings were disturbed during construction.

3.9 PERMANENT TRENCH WIDTH PAVEMENT IN CITY STREETS

A. Final pavement shall not be placed over trenches before one winter/spring period has elapsed or less than 90 days after completion of the backfilling, whichever period is longer, unless otherwise directed in writing by the OWNER.

B. Final pavement over the trench in City streets shall be constructed as follows:

1. Remove initial pavement and gravel to 4-in below existing pavement. Shape and compact subbase to 95 percent of maximum dry density as determined by ASTM D1557, Method D.
2. Saw cut, remove and dispose of a minimum of 12-in wide existing pavement on each side of the temporary pavement width. Broom and tack coat all edges with emulsified or cutback asphalt.
3. Place Binder Course and compact to 2-in thickness by steel-wheeled roller in 2-1-in lifts.
4. Broom and tack coat edges of existing pavement and Binder Course with emulsified or cutback asphalt.
5. Place Top Course and compact to 2-in thickness, finish smooth, dense and flush with surface of existing pavement.

3.10 FINAL FULL WIDTH PAVEMENT IN CITY STREETS

A. Final full width overlay pavement over the entire paved traveled way shall be constructed as:

1. Cold plane street edges as required to maintain the existing curb reveal, or edge of pavement reveal where no curb exists to insure proper water drainage of the street upon completion of the curb-to-curb (edge of pavement) overlay.

2. Repair all soft and broken areas in temporary and existing pavement. Remove all cold patch which has been placed. Clean all surfaces to be paved of all foreign matter and loose material. All surfaces shall be dry before priming.

3. Raise all manhole, drop inlet and catch basin frames, gate valve and curb stop boxes, gas drips and valves and any other pavement penetrations to finished elevation of the new pavement. All raised appurtenances shall be grouted with concrete or otherwise as approved by the Engineer to flrm1y support them flush with the surface of the new pavement.

4. Where required, level depressions in the initial pavement with bituminous material approved by the Engineer.

5. Repair any defects in curbing caused by the Contractor's operations.

6. Spread and compact Top Course to 1-1/2-in thickness over existing pavement to the entire width of the pavement. Bituminous concrete shall be placed by mechanical spreader except in areas inaccessible to the spreader.

7. Wherever the edge of the new pavement passes over existing paved driveways or side streets, or the new pavement ends on existing pavement, the existing pavement shall be grooved 1-in deep in the surface such that the surface of the new pavement will slope to the surface of the existing pavement in not less than 18-in and the new pavement will not be less than 1-in thick.

8. Clean all pavement penetrations and remove all loose aggregate from the site.

B. Cold planing shall be performed as follows:

1. In areas directed by the Engineer and specified in paragraph 3.02.A.8 of this Section, remove up to 2-in of bituminous concrete using a cold planer. The planing machine shall be specifically designed and built for planing flexible pavements and have the ability to plane concrete patches when encountered in bituminous pavement.

2. The planing machine shall be self-propelled and have the means for planing without tearing or gouging the underlaying surface and blading the cutting into a window. The ma- chine shall be capable of being operated at speeds from 10 to 40 feet per minute and designed such that the operator can at all times observe the planing operation without leaving the control area. The machine shall be adjustable as to crown and depth.

3. All manhole/catch basin covers and grates and other items at the roadway surfaces shall be lowered to a sufficient depth prior to cold planing. AH damaged covers, grates and utility boxes shall be replaced with new covers, grates or utility boxes by the Contractor, at his/her expense.

4. The equipment furnished shall be maintained so as to produce a clean cut in the pavement at all times.

5. The planed surface shall conform generally to the grade and cross slope required and be free from being tom, gouged, shaved, broken or excessively grooved.

6. Surface texture shall be as specified by the Engineer and in all cases be acceptable to traffic in the event resurfacing is delayed.

7. No cutting shall remain on the project at the end of each workday. Properly dispose of all waste materials as specified in at no additional compensation.

8. The planed surface shall be free of imperfections of workmanship that will prevent the surface from being resurfaced with new pavement following this operation.

9. The planed width shall be a maximum of 6-ft from the curb or edge of existing pavement. The Contractor shall not be paid for widths exceeding 6-ft planed for the Contractor's convenience. The Contractor will be paid for widths exceeding 6-ft, where directed by the Engineer.

3.11 INITIAL PAVEMENT AROUND MANHOLES

A. Initial manhole pavement shall be placed wherever existing pavement has been removed or disturbed as soon as practical after backfilling is completed. In all cases, pavement must be completed on Friday such that restoration is complete prior to the weekend.

1. The bank-run gravel subbase shall be excavated to a depth of 2-in below the existing pavement, shaped, and compacted.
2. Existing paving shall be mechanically cut outside the trench limits around the manhole frame, approximately a 4-ft square
3. Hose clean all road surfaces adjacent to the trench area to be paved. No paving is to be placed until subsurface is dry.
4. Prior to laying the pavement, trimmed edges shall be stable and unyielding, free of loose or broken pieces and all edges shall be thoroughly swept and coated with an asphalt tack coat
5. The initial manhole pavement, 2-in, shall be placed and compacted by steel-wheeled rollers of sufficient weight (not less than 250 pounds per inch of tread) to thoroughly compact the bituminous concrete without damaging the existing pavement. The new pavement shall be rolled smooth and even with the existing pavement.
6. Initial pavement shall be maintained in a condition suitable for traffic until replaced or overlaid by final pavement. Defects shall be repaired within 3 days of notification of such defects.
7. Apply temporary pavement markings on streets where existing markings were disturbed during construction.

3.12 PERMANENT MANHOLE PAVEMENT

A. Final pavement shall not be placed over trenches before one winter/spring period has elapsed or less than 90 days after completion of the backfilling, whichever period is loner, unless otherwise directed in writing by the Engineer.

B. Final manhole pavement shall be constructed as follows:

1. Remove initial pavement and gravel around the frame and cover to 4-in below existing pavement. Shape and compact subbase to 95 percent of maximum dry density as determined by ASTM D1557, Method D.
2. Saw cut, remove, and dispose of a minimum of 4’ x 4’ of existing pavement around the frame and cover. Broom and tack coat all edges with emulsified or cutback asphalt.
3. Place Binder Course and compact to 2-1/2-in thickness by steel-wheeled roller.
4. Broom and tack coat edges of existing pavement and Binder Course with emulsified or cutback asphalt.
5. Place Top course and compact to 1-1/2-in thickness, finish smooth, dense and flush with surface of existing pavement.
6. Wherever the edge of the new pavement ends on existing pavement, the existing pavement shall be grooved 1-in deep in the surface such that the surface of the new pavement will slope to the surface of the existing pavement in not less than 18-in and the new pavement will not be less than 1-in thick.
7. Clean all pavement penetrations and remove all loose aggregate from the site.

3.13 EXISTING CURBING AND ISLANDS

A. Existing concrete, bituminous, timber or granite curbing and/or islands shall be protected. If necessary, curbing shall be removed and replaced after backfilling. Curbing and islands which are damaged during construction shall be replaced with curbing and islands of equal quality and dimension at the Contractor's expense. Granite curbing removed and reset shall conform to RIDOT Bluebook standards. Joints between sections shall be pointed as required after resetting. Bituminous berms shall conform to RIDOT Bluebook standards.

3.14 TOLERANCES

A. Section 014000 – “Quality Requirements”: Tolerances.

B. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

C. Scheduled Compacted Thickness: Within 1/4 inch.

D. Variation from Indicated Elevation: Within 1/2 inch.

3.15 FIELD QUALITY CONTROL

A. Section 014000 – “Quality Requirements”: Requirements for inspecting, testing.

B. Asphalt Paving Density: ASTM D1188 or ASTM D2726; test one core sample from every 1000 square yards compacted paving.

3.16 PROTECTION

A. Section 017300 “Execution”: Requirements for protecting finished Work.

B. Immediately after placement, protect paving from mechanical injury for 24 hours or until surface temperature is less than 140 degrees F.

END OF SECTION 321216

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Painted markings applied to asphalt paving.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to marking asphalt paving or concrete surfaces including, but not limited to, the following:

a. Asphalt-paving or concrete-surface aging period before application of pavement markings.
b. Review requirements for protecting pavement markings, including restriction of traffic during installation period.

1.4 ACTION SUBMITTALS

A. Product Data: Include technical data and tested physical and performance properties.

1. Pavement-marking paint, alkyd.
2. Pavement-marking paint, solvent-borne.
3. Pavement-marking paint, acrylic.
4. Pavement-marking paint, latex.
5. Glass beads.

B. Shop Drawings:

1. Indicate pavement markings, colors, lane separations, defined parking spaces, and dimensions to adjacent work.
2. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of RIDOT Bluebook standards for pavement-marking work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for alkyd materials 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain pavement-marking paints from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design".

2.3 PAVEMENT-MARKING PAINT

A. Pavement-Marking Paint, Alkyd: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248, Type N; colors complying with FS TT-P-1952.

1. Color: As indicated.

B. Pavement-Marking Paint, Solvent-Borne: MPI #32, solvent-borne traffic-marking paint.

1. Color: As indicated.

C. Pavement-Marking Paint, Acrylic: Acrylic, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952F, Type II, with drying time of less than 45 minutes.

1. Color: As indicated.

D. Pavement-Marking Paint, Latex: MPI #97, latex traffic-marking paint.

1. Color: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement-marking substrate is dry and in suitable condition to begin pavement marking in accordance with manufacturer's written instructions.

B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 ROADWAY MARKINGS

A. Markings: Located as follows:

1. Parking areas.

B. Remove all surface dirt within the areas to be painted. Large areas of tar, grease or foreign materials may require sand blasting, steam cleaning or power brooming to accomplish complete removal. Do not proceed with the application of stripes until final authorization is received from the Engineer.

C. Markings: Fast drying white water-borne traffic paint as follows:

Material Application Material	Line Temperature	Reflectorized Bead Thickness	Application
M7 .01.23	40 to 120 deg F	15 mils	6 lbs / gal

D. Use no thinners for the above listed pavement marking applications except in accordance with the manufacturer's specifications and at the direction of the Engineer.

E. Do not heat paint or pavement marking material above the temperature marked on the container.

F. Bituminous concrete pavements must be in place for 48 hours prior to the application of pavement markings.

G. If for any reason material is spilled or tracked on the pavement, or any markings applied, in the Engineer's judgement, fail to conform because of a deviation from the desired pattern, remove such material by a method that is not injurious to the roadway surface and is acceptable to the Engineer, clean the roadway surface and prepare the surface for a reapplication of markings and reapply the markings as directed without additional compensation for any of the foregoing corrective operations.

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 321723

SECTION 329000

LANDSCAPING

PART 1 GENERAL

1.01 SCOPE

A. This section of the specification covers all labor, materials, and equipment necessary to do all loaming, seeding and related work as indicated on the drawings, scope of work, and as herein specified. All lawns disturbed by the Contractor's operations shall be repaired as herein specified.

1.03 PROTECTION OF WORK

A. For a particular source of loam, the Engineer may require the Contractor to send approximately ten (10) pounds of loam to an approved testing laboratory and have the following tests conducted:

1. Organic concentration
2. pH
3. Nitrogen concentration
4. Phosphorous concentration
5. Potash concentration

B. These tests shall be at the Contractor's expense. Test results, with soil conditioning and fertilizing recommendations, shall be forwarded to the Engineer.

1.04 SUBMITTALS

A. Shop Drawings and/or brochures shall be submitted for all items furnished in accordance with the provisions of the General Conditions.

B. Submittals required under this section include, but are not limited to, manufacturer's information detailing for the following:

1. Seed mixes.
2. Fertilizers.
3. Mulch material.
4. Slope protection material (if required).
5. Origin of loam.

C. Test results shall be submitted to the Engineer for review.

PART 2 MATERIALS

2.01 LOAM

A. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity, obtained from naturally well-drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth. Loam shall not be delivered to the site in frozen or muddy condition and shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than one (1) inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.

B. The loam shall contain not less than five (5) percent nor more than twenty (20) percent organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F.

2.02 LIME

A. Lime shall be standard commercial ground limestone containing at least fifty (50) percent total oxides (calcium oxide and magnesium oxide), and fifty (50) percent of the material must pass through a 100 mesh screen with ninety-eight (98) percent passing a 20 mesh screen.

2.03 FERTILIZER

A. Fertilizer shall be commercial fertilizer, 10-10-10 fertilizer mixture containing at least forty (40) percent of organic nitrogen for seeded areas and 10-6-4 fertilizer for shrub beds. It shall be delivered to the site in the original sealed containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it will be dry and free flowing. No fertilizer shall be used which has not been marketed in accordance with State and Federal Laws, relating to fertilizers.

2.04 MULCH

A. Hay Mulch - Hay Mulch shall consist of mowed and properly cured grass, clover or other acceptable plants. No salt hay shall be used.

B. Straw Mulch - Straw Mulch shall consist of stalks or stems of grain after threshing.

C. Wood Fiber Mulch - Wood Fiber Mulch shall consist of wood fiber produced from clean, whole uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.

2.05 SEED

A. Seed shall be of an approved mixture, the previous year's crop, clean, high in germinating value, a perennial variety, and low in weed seed. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.

C. Seed mix shall meet the following material specifications:

1. Seed Mix No. 1 (Slopes)

Type	% By Weight
Creeping Red Fescue	70
Astoria Bentgrass	5
Birdsfoot Trefoil	15
Perennial Rye Grass	10

Application Rate: 200 lbs/ acre

2. Seed Mix No. 2 (Mowed/Lawn Areas)

Type	% By Weight
Nassau Kent Blue	60
Jamestown Chewings Fescue	20
Palmer Perennial Rye Grass	20

Application Rate: 200 lbs/ acre

3. Seed Mix No. 3 (Sand Filter Seed Mix)

Type	% By Weight
Fox Sedge	20
Virginia Wild Rye	16
Riverbank Wild Rye	15
Japanese Millett	15
Deer Tongue	15
Blunt Broom Sedge	9
Switch Grass, ‘Cave-in-Rock’	5
Green Bulrush	2
Awl Sedge	2
Autumn Bentgrass	1

Application Rate: 15-25 lbs/ acre

2.06 SLOPE EROSION PROTECTION

A. GEOWEB Slope Protection System, or equal, shall be used on all slopes 3:1 or steeper. Install in accordance with manufacturer recommendations.

2.07 PLANT MATERIAL

A. All plant material shall conform in size, grade, and quality to the "AAN American Standard for Nursery Stock" as approved by the United States of America Standards Institute in effect at time of bid advertisement. All scientific and common plant names of the items specified shall conform to the edition of "Standardized Plant Names", as adopted by the American Joint Committee on Horticultural Nomenclature in effect at time of bid advertisement.

B. All plant material shall be nursery grown, no collected material will be accepted. All plant material shall be free from all insects, pests, plant diseases, disfiguring knots, stubs, sunscald, abrasions, or cuts of the bark or any other form of injury harmful to the health of the plant material. All plant material shall comply with State and Federal Laws with respect to inspection for plant diseases and insect infestations.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. After approval of rough grading, loam shall be placed on areas affected by the Contractor's operations. Loam shall be at least four (4) inches compacted thickness.

B. Lime shall be applied to bring the pH to 6.5 or, without a soil test, at the rate of 2 to 3 tons of lime per acre.

C. Fertilizer shall be applied according to the soil test, or without a soil test, at the rate of 8 pounds per 1,000 square feet.

D. Loam shall be worked a minimum of three (3) to four (4) inches deep, thoroughly incorporating the lime and fertilizer into the soil. The loam shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing not over one hundred (100) pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be four (4) inches after completion.

3.02 SEEDING

A. Seeding shall be done when weather conditions are approved as suitable, in the periods between March 15 and May 31 or August l5 to October l5, unless otherwise approved.

B. If there is a delay in seeding, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, the soil shall be lightly raked.

C. Seed shall be sown at the approved rate, on a calm day by machine.

D. One half the seed shall be sown in one (1) direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of l/4 inch and rolled with a roller weighing not more than one hundred (l00) pounds per linear foot of tread.

E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than three (3) sq. ft., the Contractor shall reseed, roll, and water as necessary to obtain proper germination at no additional cost to the OWNER

F. The Contractor shall water, weed, cut and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.

G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the Contractor or on order of the Engineer. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized, and the permanent seed crop shall be sown as specified.

3.03 PLACING MULCH

A. Dark Hemlock Mulch shall be loosely spread to a uniform depth over all areas designated on the plans.

B. No red or dyed mulch shall be used.

C. Mulch shall be pulled away from plant trunks or stems and is not allowed to rest directly against the trunk or stem.

D. Mulch may be applied by mechanical apparatus, if in the judgment of the Engineer the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. The apparatus shall be capable of spreading at least eighty (80) percent of the mulch in lengths of six (6) inches or more, otherwise it shall be spread by hand without additional compensation.

3.04 SEEDING AND MULCHING BY SPRAY MACHINE

A. The application of lime, fertilizer, grass seed and mulch may be accomplished in one (1) operation by the use of an approved spraying machine. The materials

shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of lime, fertilizer, grass seed and mulch shall be equal to the specified quantities.

B. A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of limestone, fertilizer, grass seed and mulch per one hundred (100) gallons of water.

C. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the spray operation are unsatisfactory, the Contractor will be required to abandon this method and to apply the lime, fertilizer, grass seed and mulch by other methods.

3.05 PLANT MATERIALS

A. All plant material shall be dug and handled in accordance with the American Association of Nurseryman's Standards for nursery stock. All shipments shall comply with all nursery inspection and quarantine regulations in accordance with Federal, State, and local regulations. A certificate of inspection shall accompany each shipment.

B. All plant material shall be kept moist, fresh, and protected against exposure to sun, wind, and freezing temperatures. Balled and burlapped plants shall have their rootballs covered by earth, wood chips, cloth, straw, or other suitable material which shall be kept moist.

C. All plant material with the exception of pines shall be planted during the following seasons: Spring - March 1 to June 15 and Winter – September 1 to December 1. Pines shall be planted during the following season: Spring – April 1 to May 15 and Winter – August 15 to October 15. No planting shall be performed in frozen ground or when snow covers the ground.

D. Plant material locations shall be staked on the project site in accordance with the Plans prior to any plant pits being excavated. All staked locations shall be approved by the Engineer prior to excavation.

E. Planting holes shall be twice the diameter of the root ball in width and equal to the depth of the root ball to the level at which it was grown in the nursery. Any excavation in excess of that required shall be replaced and compacted at eighty-five (85) percent maximum density.

3.06 INSPECTION AND ACCEPTANCE

A. At the beginning of the planting season following that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section one square foot or larger not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense.

B. The contractor shall keep all seeded areas watered and in good condition, reseeding if and when necessary, for an 8-week period or until a good, healthy, uniform growth is established over the entire area. The contractor shall also maintain these areas in an approved condition until provisional acceptance. The contractor shall be responsible for two mowings of the new grass prior to acceptance by the City. During this period, contractor is responsible to water as necessary to maintain an adequate supply of moisture within the root zone.

C. All plants furnished by the contractor shall be guaranteed for a period of 2 years after preliminary inspection and shall be alive and in satisfactory growth at the end of the guarantee period. All dead or dying plant material shall be replaced at once by the contractor, free of charge.

END OF SECTION 329000

SECTION 329119 - LANDSCAPE GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Final grade topsoil for finish landscaping.

B. Related Sections:

1. Section 312333 - “Trenching and Backfilling”: Backfilling trenches.
2. Section 321216 - “Asphalt Paving.”

1.3 SUBMITTALS

A. Section 013300 – “Submittal Procedures”: Submittal procedures.

B. Samples: Submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of imported materials source.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each topsoil material from single source throughout the Work to form an established strand of grass, free of weeds.

B. Perform Work in accordance with RIDOT Bluebook standards.

C. Maintain one copy on site.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Loam shall be fertile, natural soil, typical of the locality, free from large stones, roots, sticks, clay, peat, weeds and sod and obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth. Topsoil stockpiled under other Sections of this Division may be used but the Contractor shall furnish additional loam at his own expense, if required.

B. Fertilizer and lime shall be spread and incorporated as per soil test recommendations after the loam is spread but prior to fine grading. Fertilizer and lime shall be spread a minimum of two weeks apart. Under no conditions shall they be spread within this time period.

C. Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity of not less than 85, and shall have not more than one percent weed content. The mixture shall consist of seed proportioned by weight as follows:

1.	Creeping Red Fescue	55%
2.	Kentucky Bluegrass	25%
3.	Red Top	5%
4.	Domestic Rye Grass	15%

For slopes and other areas:

1.	Chewing Fescue or Creeping Red Fescue	35%
2.	Alta Fescue	35%
3.	Red Top	5%
4.	White Clover Alsike	10%
5.	Domestic Rye Grass	15%

D. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

2.2 LOAM AMENDMENTS

A. Commercial fertilizer, peat, humus, sand or other additives shall be used to counteract soil deficiencies as recommended by the soil analysis and as directed by the Engineer.

B. Fertilizer shall be LESCO 10-10-10 or approved equal based on soil test results for use as a starter fertilizer. It shall be delivered to the site in the original unopened containers each showing the manufacturer's certificate of compliance and guaranteed analysis and shall comply with the State and United States Fertilizer Laws. Store fertilizer so that when used it shall be dry and free flowing. At least 50% by weight of the Nitrogen content shall be derived from organic materials. Fertilizer shall contain not less than the percentages of weight of ingredients or as recommended by the soil analysis.

C. Lime shall be ground limestone of an approved agricultural dolomite limestone containing not less than 85% of total calcium or manganese carbonates. Limestone shall be ground to such fineness that 50% will pass through a 100 mesh sieve and 95% will pass through a 20 mesh sieve.

D. Humus shall be natural humus, reed peat or sedge peat, which has been stockpiled for at least one year prior to its use. It shall be free from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form. According to the methods of testing of A.O.A.C., latest edition, the acidity range shall be approximately 5.5 pH to 7.6 pH and the organic matter shall not be less than 85% as determined by loss on ignition. The minimum water absorbing ability shall be 200% by weight on an oven dry basis.

E. Peat moss shall be composed of partly decomposed stems and leaves of any or several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue and other foreign matter. It shall have an acidity range of 3.5 pH to 5.5 pH as determined in accordance with the methods of testing by A.O.A.C., latest edition. Its water absorbing ability shall be a minimum of 1,000% by weight on an oven dry basis.

F. Superphosphate: Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than 18% available phosphoric acid.

G. Provide all equipment necessary including temporary water for irrigation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017300 – "Execution": Verification of existing conditions before starting work.

B. Verify building and trench backfilling have been inspected.

C. Verify substrate base has been contoured and compacted.

3.2 PREPARATION

A. Protect landscaping and other features remaining as final Work.

B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION

A. Eliminate uneven areas and low spots.

B. Remove debris, roots, branches, stones, in excess of 2 inch in size. Remove contaminated subsoil.

C. Scarify surface to depth of 6 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

A. Place topsoil in areas where seeding, sodding, and planting, is required. to nominal depth of 6 inches. Place topsoil during dry weather.

B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.

C. Remove roots, weeds, rocks, and foreign material while spreading.

D. Manually spread topsoil close to plant material and buildings to prevent damage.

E. Roll placed topsoil.

F. Remove surplus subsoil and topsoil from site.

G. Fertilizer shall be uniformly spread and immediately mixed with the upper 2-in of loam at the rate of 5 pounds per 1,000 square feet, or more, as recommended by soil analysis.

H. Immediately following this preparation the seed shall be uniformly applied and lightly raked into the surface. Lightly roll the surface and water with a fine spray. Seed shall be sown in a favorable season, as approved by the Engineer.

I. Seeding shall be done within ten days following soil preparation. Seed shall be applied at the rates and percentages indicated. One half of the seed shall be sown in one direction, and the other half at right angles to the original direction.

J. Hydroseeding may be performed in lieu of seeding. Methods, materials and application rates must be approved by the Engineer.

K. Keep all seeded areas watered and in good condition, reseeding if and when necessary until a good, healthy, uniform growth is established over the entire area seeded, and shall maintain these areas in an approved condition until final acceptance of the Contract.

L. On slopes, provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good sod is established.

M. Maintain the areas in grass in a neat manner by watering, mowing, raking clippings and leaves, and appurtenances until the project is completed.

N. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 MAINTENANCE FOR PROVISIONAL ACCEPTANCE

A. The Contractor is responsible for site security during grow-in maintenance and shall provide fencing and other appropriate methods to ensure turf is protected from access and use at no additional cost to the OWNER. Maintenance shall begin immediately after any area is seeded or and shall continue until final acceptance. In any case, the minimum period of maintenance for all turf areas shall be 12 weeks after all seed is installed. When entire planted areas are established, the Contractor shall request an inspection of the work by the Engineer and the OWNER.

B. Maintenance shall continue in all areas until a uniform turf is established over the entire site. Maintenance shall include reseeding, removal of dead plants and installation of new plants,

mowing, watering, weeding and fertilizing.

3.6 PROVISIONAL ACCEPTANCE

A. Keep all seeded areas watered within the work areas and in good condition, reseeding or replanting areas if and when necessary until a good healthy, uniform growth is established over the entire area, and shall maintain all areas in an approved condition until provisional acceptance.

B. The Engineer will inspect all work for provisional acceptance at the end of a 12 week maintenance period upon the written request of the Contractor, received at least ten days before the anticipated date of inspection.

C. A satisfactory stand of seeded areas will be defined as an area of 20,000 square feet or larger that has:

1. No bare spots larger than 4 square inches.
2. No more than 5 percent of total area with bare spots

D. The inspection by the Engineer will determine whether maintenance shall continue in any area or manner.

E. After all necessary corrective work and clean-up has been completed, and maintenance instructions have been received by the OWNER, the Engineer will certify in writing the provisional acceptance of the seeded and sodded areas. The Contractor's responsibilities for maintenance of seeded areas shall cease on receipt of provisional acceptance.

3.7 TOLERANCES

A. Section 014000 – “Quality Requirements”: Tolerances.

B. Top of Topsoil: Plus or minus 1/2 inch.

3.8 PROTECTION OF INSTALLED WORK

A. Section 017300 “Execution”: Requirements for protecting finished Work.

B. Prohibit construction traffic over topsoil.

3.9 SCHEDULES

A. Compacted topsoil thicknesses:

1. Seeded Grass: 6 inches.
2. Sod: 4 inches.

END OF SECTION 329119

SECTION 330130.16 - TV INSPECTION OF PIPELINES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Each designated pipe section shall be visually inspected by means of closed-circuit television. The inspection shall be done one line section (i.e., manhole to manhole) at a time and the section being inspected shall be suitably isolated from the remainder of the system as required.

B. Video recordings shall be made of the television inspections and two (2) portable hard drives containing digital copies of each video shall be supplied to the OWNER for his inspection and files. Cost of hard drives shall not be paid for separately and shall be considered are included in the prices bid for the various items of work in the Bidder's Blank, and therefore no separate payment will be made.

C. The naming convention for each of the video files shall be as follows:

Upstream MH_ Downstream MH_ Date

D. Related Requirements:
1. Section 331210 "Temporary Bypass Pumping Systems."

1.3 ACTION SUBMITTALS

A. Data:

1. Database structure and file naming plan
2. External Hard Drives become property of OWNER.
3. Sewer Assessment Reports

B. Assessment Procedures Plan

1. Pipeline assessment plan
2. List of equipment to be used on the project, including product literature for all video equipment (including cabling, camera, footage counter, tilting device, and recorder)

C. Proposed door hanger for public notification.

1. The City shall review and edit the submitted door hanger notification, prior to printing and distribution.

D. Qualification Statements

1.4 INFORMATIONAL SUBMITTALS

A. Informational Submittals: Prior to beginning assessment work, submit the following to the OWNER

1. Qualifications statement in accordance with the City of Providence RFP documents.

B. Traffic Control plan for work in areas of vehicular travel, submitted to, and approved by Providence Traffic Engineering.

C. List of Project staff, including qualifications of Crew Chief and CCTV operator.

D. Spill plan to address any spills that might occur.

E. Two copies of the NASSCO-issued "certified PACP user" identification card showing certification number for each CCTV operator that will be performing assessment work on the Project. Work shall not commence until such certification is provided.

F. Confined Space entry and hazardous atmosphere training certifications for all staff that will be involved in work located within or near manholes.

1.5 QUALITY ASSURANCE

A. Perform Work according to NASSCO PACP standards, latest version.

1.6 QUALIFICATIONS

A. Contractor/Subcontractor: Successfully performed work on at least ten other projects within the last five years that include at least 1,000,000 linear feet of CCTV video experience in NASSCO PACP format in gravity sewers 8-inches in diameter or greater.

B. CCTV Operator: Successfully performed work on at least three other projects within the last five years that includes at least 250,000 linear feet of CCTV video experience in gravity sewers using NASSCO PACP format.

C. Crew Chief: Minimum of five years of experience on projects involving the assessment of gravity sewer measuring 8 inches in diameter or greater and experienced in using the proposed equipment

PART 2 - PRODUCTS

1.1 EXTERNAL HARD DRIVES

A. Description: A portable storage device that can be attached to a computer through a USB connection.

B. Solid state data storage devices are preferred.

1.2 CCTV SOFTWARE

A. Capable of providing complete survey reports in compliance with the most recent version of NASSCO PACP.

B. The PACP defect and construction codes shall be pre-programmed in the CCTV software and shall

be grouped by PACP Groups.

C. Software and Databases

1. Fully compliant with PACP.
2. Capable of customization with the ability to modify or add to the pipeline condition and group them for ease of use.
3. Assessment and reporting software program shall be menu-driven and shall have a complete on-screen help file.
4. NASSCO PACP mandatory fields and any additional available field requested by the OWNER shall be setup in the software prior to the assessment, and all of these fields shall be populated with information collected during the assessment. Any general and pipe segment information that is already known prior to the assessment shall be entered into the appropriate fields in advance of performing the physical assessment.
5. Maintain a database of underground pipe and manhole assets. Structure the asset database similar to the one referencing pipe usage (i.e., sanitary, storm, drainage, etc.) sections (i.e., projects, areas, quadrants).
6. Surveys include a method of pipe segment numbering and a chronological survey set-up numbering system.
7. Capacity to import and export survey results in the most recent NASSCO PACP exchange format.

D. The footage reading from the camera equipment shall be automatically entered into the survey log and shall directly correspond to the noted observation location throughout the pipe graphical and tabular reports generated.

1.3 SEWER ASSESSMENT REPORTS

A. File Naming Conventions: Name all files in accordance with the requirements of the OWNER and CDM Smith to allow direct linking of files to pipe assets using a common unique identifier.

1. Each manhole has been given a unique manhole identification (Asset ID). The file name for each pipeline assessed shall be that unique upstream manhole Asset ID followed by an underscore followed by the unique downstream manhole, then the date of inspection such as: 0123S0456_0123S0457_MMDDYYYY.pdf.
2. If an unnamed manhole is found, the letter “A” shall be added to the end of the upstream manhole’s Asset ID to form a new Asset ID. The data/video files shall then be renamed to include the new Asset ID and a new CCTV assessment shall be started from the new Asset ID.
3. If more than one unnamed manhole is found between two named manholes, subsequent new manhole Asset IDs shall be formed using the letters “B”, “C”, etc.
4. If an unnamed manhole is found, provide documentation showing the location of the unnamed manhole to the OWNER depicting the change in connectivity found in the field.
5. If the contractor performs a reverse setup and televises an individual pipe segment from more than one direction (i.e., the camera is only able to televise a portion of the entire segment heading downstream, and the remaining portion of the pipe segment was televised heading upstream) then two or more separate video files are allowable. The name of the additional database files etc. (i.e., unique manhole Asset ID followed by an underscore followed by the unique downstream Asset ID) followed by “_1”, “_2” etc. at the end of the

filename so that it is clear there are multiple files and videos for the same pipe segment. If unnamed manhole(s) is (are) found the procedure previously described shall also apply. Examples:

a. Initial filename: 0015S0001_0015S0002_MMDDYYYY
b. Additional filenames: 0015S0001_0015S0002_MMDDYYYY_1

Base the name of each digital still photo on the video/data filename of the specific sewer in which the photo was taken. Record the name as the video/data filename followed by the PACP code for the item pictured, followed by the footage at which the observation was encountered. Examples:

c. (Filename)_(PACP Coded)@(footage).jpg
d. 0015S0001_0015S0002_MMDDYYYY_HSV@37_2.jpg
e. 0015S0001_0015S0002_1_MMDDYYYY_MCU@113_6.jpg

B. Format all data files to facilitate upload into a NASSCO PACP exchange database.

C. Digital Video: CCTV assessments shall be captured at a minimum video bit rate of 4,500 kbps.

D. Indicate individual survey results in tabular form and provide a sortable list of surveys based on a user-defined description field. Include the starting and ending manhole Asset IDs depths, pipe material, total survey length, and pipe diameter. All reports and and/or submittals shall comply with the most recent version of NASSCO PACP standards.

E. Submit assessment data to the OWNER on a weekly basis; including digital videos, digital photos, and evaluation reports, all in electronic format on portable external hard drive. All hard drives and the information contained within them are the property of the OWNER after submittal.

1. Fill data on each portable external hard drive to minimize the number of hard drives submitted. The hard drives shall contain separate digital files for each manhole-to-manhole section of pipe assessed.
2. Sections of a single segment of sewer shall not be recorded to more than one hard drive.
3. Video footage of recorded segments shall be grouped by area and shall be submitted in sequential order relating to the area mapping designation.
4. The footage counter reading from the camera shall appear on all videos.
5. Separate folders shall be created on the external hard drives for assessment data, digital videos, digital photos, evaluation reports, supporting documentation etc. so all submittals of the same type are in a single folder.
6. Separate subfolders shall not be used be used to separate submittals of the same type under the main folder.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field verify location of sewer pipelines to be inspected.

3.2 PREPARATION

A. Sewer Flow Control

1. Evaluate each segment of sewer to be assessed with respect to diameter, flow rate, velocity, upstream/downstream manhole diameter, debris levels, extent of pipe wall corrosion, and accessibility. Select and provide the most appropriate equipment and methods based on the condition of the specific sewer line segment and its access manhole(s) at the time the work commences.

2. All assessment work shall be attempted during periods of low flow in the sewer segments being assessed.

3. At all times during the assessment, the flow in the sewer line segment(s) being assessed shall be suitably controlled as needed to perform the assessment in accordance with Section 331210 “Temporary Bypass Pumping Systems.”

4. If the depth of flow in the sewer segments to be assessed is above the maximum allowable for the use of standard CCTV equipment, use of floating inspection equipment can be used.

   If the depth of flow in the sewer segments to be assessed is above the maximum allowable for the use of floating inspection equipment, off peak hours should be pursued to perform the assessment. If flow levels are not sufficient during off peak hours, the flow level shall be lowered by either:

   a. using flow through plugs
   b. performing bypass pumping as approved by the OWNER.

5. When flow in a sewer line is plugged, blocked, or bypassed, take precautions:

   a. to protect the sewer lines from damage that might result from sewer surcharging.
   b. to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewer involved.

B. The equipment and methods used for each sewer pipe and the setup location shall conform to the submitted and reviewed plan.

1. Standard CCTV equipment is appropriate for sewer segments that:

   a. Have a depth of flow less than 25 percent of the pipe diameter.
   b. Do not have signs of corrosion.
   c. Do not appear to have significant debris accumulation below the water surface.

2. Floating HD Image equipment is appropriate for sewer segments that:

   a. Do not meet the previously listed conditions for using standard and CCTV equipment.
   b. Require longer continuous lengths of assessment due to the difficulty of the manhole access or connection to a buried manhole or manholes.

C. Perform sewer line cleaning in accordance with Section 330130.41 “Cleaning of Sewers” to provide a thorough assessment of the sewer condition.

3.3 APPLICATION

A. CCTV Equipment

1. Provide a mobile vehicle large enough to accommodate at least three people with video monitoring equipment specifically compatible with the camera equipment being used. OWNER and his representative shall have unrestricted access to observe the television screen and all other operations.

2. CCTV Camera:

   a. Designed and constructed for such assessment.
   b. Capable of producing digital still photos of all sewer observations and service connections.
   c. Adjustable light source generates an even distribution of lighting for the camera that results in a clear color picture of the entire periphery of the pipe.
   d. Operable in 100 percent humidity conditions and in a hazardous and corrosive environment.
   e. Provide a backup (spare) camera either on the Project site or at a nearby location so performance of the Work is not delayed.
   f. When usage of standard CCTV equipment is not feasible due to access issues, pipe condition, and/or depth of water flow, floating camera equipment may be used.
   g. Capable of panning 360 degrees and tilting 270 degrees and with minimum optical zoom ratio of 10:1 plus a minimum digital zoom ration of 4:1 to facilitate the assessment of all laterals and defects with optimum picture quality provided by focus and iris adjustment.

3. Floating HD Camera: the camera shall be capable of recording 360 degree view using a fisheye lens without tilting or panning.

4. CCTV Equipment:

   a. Camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the OWNER and/or his representative. Picture resolution shall be a minimum of 460 television lines (TVL).
   b. Provide a lighting system adequate for quality pictures. A reflector in front of the camera may be required to enhance the lighting in black pipe.
   c. Accurate footage counter to display on the monitor the exact distance of the camera from the centerline of the starting manhole.
   d. Compatible with the version of NASSCO PACP used by the CCTV software and the reports and submittals generated from the software.

3.4 FIELD QUALITY CONTROL

A. The following measurements shall be collected for each accessible manhole and included in the PACP exchange database:

1. Utilize GPS equipment to obtain X and Y state plane coordinates with a submeter accuracy.
2. Field-measure the vertical distance from the top of the manhole frame to the invert in accordance with NASSCO PACP standards.

B. Pipeline Assessment:

1. Each sewer section shall be assessed from the upstream manhole to the downstream manhole if possible.
2. For the upstream and downstream manholes on each segment of pipe that is assessed, pan and tilt from the invert and take digital still photos that clearly depict the entirety of the manhole interior, including cone section.
3. Assess the full length of each sewer between access points. When the camera is unable to pass an obstruction even though flow is continuing, perform a reverse setup of the CCTV equipment from the opposite access point.
4. Perform all CCTV assessments using personnel who are trained and certified (current standing) in the use of NASSCO's PACP.
5. Multiple upstream and/or downstream sewer segments can be televised from a single manhole setup location as long as each manhole to manhole video section restarts its footage counter at zero and a separate video file for each assessment is submitted.
6. The CCTV camera shall travel through the lines using its own power unless a tethered floating unit is used. The pictures taken of the entire inside periphery of the pipe shall be clear and visible. Picture quality and definition shall be to the satisfaction of the OWNER.
7. Stop the camera at all service laterals and pan at such an angle that an internal view of the service lateral is available to determine if the lateral is active, inactive, or plugged. Take photos:

    a. include a brief description of the subject of the photo directly on the photo.
    b. catalog and link in the CCTV database, so the photos correspond with the length along the sewer line where the photo of the recorded observation was taken.
    c. JPEG format and at least 50 kilobytes in size.

8. Adjust the camera height such that the camera lens is always centered in the pipe being televised.
9. Retrieve camera equipment that becomes stuck within a sewer.
10. Submit CCTV inspection videos, where reversal setups are not required, in one continuous video section from manhole to the immediately adjacent manhole and not in multiple files. If a reverse setup is required, two complete inspections and video are acceptable.

C. Calibrate camera footage on a weekly basis in the presence of the OWNER or his representative with an above ground tape measure and simultaneous CCTV footage counter.

D. Project Notifications: Notify the OWNER immediately if:

1. A collapsed pipe or other significant pipe failure is discovered.
2. The conditions for CCTV assessment are found to be unsafe or impractical.
3. A manhole is buried, cannot be found, or cannot be accessed. Include a diagram in PDF file format that clearly indicates the location of the manhole, identifies its Asset ID, and lists the procedures that were used to attempt to locate the manhole.
4. Any defects that pose immediate danger to the public are observed (i.e., missing or broken manhole covers, sinkholes, etc.).
5. Any major pipe blockages, manhole surcharging, or potential overflow conditions are observed.
6. The pipe configuration in the field is different than shown on the Drawings or scope of work. Include a diagram in PDF file format that clearly indicates the location of structures in relation to immediately adjacent structures.

7. Any significant obstructions are found within permanent sewer easement, even if these obstructions do not impact the Work.

E. Public Notifications: Provide 48 hour notice prior to the assessment of any pipe segment, distribute door-to-door a door hanger, approved by the OWNER, describing the work to be performed to notify the OWNER of every property, including residences and businesses, that may be affected. Include necessary information on bypass pumping how long residents may be unable to utilize the sewer. Door hangers shall be double-sided with the notification information in the English language on one side and in the Spanish language on the reverse side. Affected properties shall include, but not be limed to, properties on which:

1. A sewer to be accessed is located.
2. A manhole for accessing a sewer to assessed is located.
3. An existing sewer easement that could be used to access the sewer is located.
4. A temporary right-of-entry agreement with the property OWNER and the contractor for accessing a sewer or manhole on the property.
5. An existing sewer lateral serving the property directly connects to a sewer to be assessed or manhole to be accessed for the sewer assessment.

3.5 DATA QUALITY CONTROL

A. Review quality and accuracy of each submittal of CCTV assessment data and revise as needed to correct any inaccuracies prior to providing submittal to the OWNER or his representative.

B. Quality Review:

1. OWNER or his representative requires a 30-day period to review sewer assessment data/videos after each submittal has been received.
2. Payment applications will not be processed until the sewer assessment data/videos have successfully passed the quality review and have been accepted by the OWNER or his representative.
3. Additional 30-day review periods apply to each resubmittal of data/videos determined to be unacceptable by the OWNER or his representative.
4. Re-inspection is required when digital videos are inaccurate or of such poor quality that the OWNER or his representative is unable to evaluate the condition of the sewer or locate sewer service connections.
5. Provide CCTV assessment data contained on each portable external hard drive in the most recent version of PACP exchange format. Include video indexing for all observations. CCTV assessment data to be submitted:

    a. Database file
    b. Still photos in JPEG file format for each observation
    c. Video for each inspection in MPEG1 file format.
    d. Summary report for each pipe segment in PDF format.

END OF SECTION 330130.16

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SECTION 330130.41 - CLEANING OF SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section includes cleaning of sewer pipe and siphons selected for CCTV inspections as necessary to complete each project and as specified herein.

B. Cleaning includes proper high-pressure water jetting, rodding, bucketing, brushing and flushing of sewers and manholes prior to inspection by closed circuit television, pipeline rehabilitation or replacement, point repairs, and testing operations.

C. Clean all sewers to remove debris, roots, intruding services, deposits, and other blockages. Perform sewer cleaning work to an acceptable level as necessary to perform a thorough television inspection of sewer. If pipe condition is such that cleaning may cause a potential collapse, then pipe shall be televised without attempting to clean it, pending approval by OWNER or his representative. Notify OWNER immediately if cleaning cannot be completed due to pipe condition.

D. Furnish all labor, materials, equipment, and incidentals required and perform high pressure water jetting, rodding, brushing, bucketing, and flushing of designated sewer lines and manholes in streets and cross country areas as shown on the maps, and transporting debris to an approved facility, in accordance with all applicable local, state, and federal rules and regulations.

E. Related Requirements:
   1. Section 330130.16 “TV Inspection of Sewer Pipelines”.
   2. Section 331210 “Temporary Bypass Pumping Systems”

1.3 DEFINITIONS

A. Preliminary Cleaning: Small amounts of debris existing within sewer line and where sewer reaches do not require heavy cleaning, as defined below, and that produce little or no debris. Preliminary Cleaning is defined as up to six (6) passes with a jet nozzle.

B. Heavy Cleaning: Large deposits of debris or heavy root growth existing within sewer line and where sewer reaches require debris removal exceeding the definition of Heavy Cleaning, and time required to clean and inspect the line must be at least twice the average time required to clean and inspect other sewers of comparable length and diameter. Heavy cleaning is defined as more than six (6) passes with a jet nozzle or the use of a rotary cutting device.

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012001 “Price and payment”: Contract Sum/Price modification procedures.

B. Preliminary Cleaning: Clean sewer using standard industry procedures of high pressure water jetting equipment or other approved equipment. Costs related to cleaning of such sewers shall be included in Contractor’s unit prices for CCTV and Preliminary Cleaning.

1. Basis of Measurement: By linear foot.
2. Basis of Payment: TV inspection, data compiling according to NASSCO PACP standards, and audio-video recording of pipeline.

C. Heavy cleaning: Heavy cleaning must be approved by OWNER or his representative. Include costs related to cleaning of such sewers in Unit Prices for Heavy Cleaning. Costs related to televising of such sewers following heavy cleaning shall be included in Unit Prices for CCTV and Preliminary Cleaning. Compensation for heavy cleaning of a particular line will only be paid if:

1. Heavy cleaning was authorized by OWNER or his representative prior to performance of the work.
2. Contractor proves that both significant time and effort was necessary to clean the line, (i.e., time required to clean and inspect the line must be at least twice the average time required to clean and inspect other sewers of comparable length and diameter.
3. Adequate video proof of ‘before’ blockage, debris, grit or grease build-up, or other condition is provided.
4. A submerged camera does not justify a need for heavy cleaning; proof that submergence was due to a blockage or heavy debris and not a sag in the line will be required.
5. Heavy Cleaning will be paid for on a lineal foot basis only for length required to be cleaned, i.e., from downstream manhole to approximate location of heavy cleaning. This may or may not include entire pipe section, unless otherwise approved by OWNER.
6. Use of a rotar to grind down an intruding tap does not justify payment for heavy cleaning in addition to payment for removal of an intruding tap.

D. Pipes that contain excessive blockages must be reported to OWNER immediately.

1.5 INFORMATIONAL SUBMITTALS

A. Submit a safety plan prior to performing any on-site work that includes the following as a minimum:

1. Confined Space Entry.
2. Personal Protective Equipment.

B. Qualifications Statements:

1. Contractor shall have a minimum of five years’ experience in sewer line and underground structure cleaning. Submit a list of at least three customers who have had similar work

complete. Furnish trained and qualified technicians with proper experience operating equipment that is being used on this project.

1.6 CLOSEOUT SUBMITTALS

A. Submit one complete set of documentation regarding inspections and work performed. Based on work scope, submit written reports, photographs and External Hard Drives that incorporate color video and data per Section 330130.16 “TV Inspection of Sewer Pipelines”.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.2 GENERAL

A. Contractor shall be solely responsible for his means and methods of sewer cleaning. Selection of cleaning equipment and the method for cleaning shall be based on the condition and/or pipe material of the sewer segment at the time work commences and shall comply with this Specification. FLUSHING OF ANY SANITARY SEWER TO FACILITATE CLEANING ACTIVITIES WITHOUT THE CAPTURE OF SOLIDS AND DEBRIS IS EXPRESSLY PROHIBITED.

B. Sewer line walls shall be cleaned adequately to provide for a camera used during the CCTV phase to discern structural defects, misalignment, and infiltration/inflow sources, and to the extent required for proper installation of cured-in-place pipe liner.

C. Start the cleaning operation with the upstream sewers in the system and proceed downstream with the direction of flow.

D. Clean all contributing upstream sewers before proceeding with cleaning downstream sewers.

E. Under NO circumstances will the Contractor be allowed to obtain water from any water bodies, unless they receive written permission from RIDEM and notify the City in writing prior to work.

F. Contractor shall be required to obtain formal authorization from Providence Water when the supply of water is from local fire hydrants. Water supplied from fire hydrants or other sources shall be at the expense of the Contractor and shall include all requirements related to obtaining water, and installation of a meter and backflow preventer, if required. The Contractor is responsible for any damages resulting from the improper use of the water supply system. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant, nor shall a hydrant be used for the purpose described unless a vacuum break is provided. The Contractor shall make every effort to conserve and not use water unnecessarily.

G. Transport all debris to at an approved facility, in accordance with all applicable local, state, and federal rules and regulations. Contractor to pay for disposal of all debris.

H. Remove debris, roots, intruding services, deposits, and other blockages as necessary to perform a

thorough television inspection of sewer. If pipe condition is such that cleaning may cause a potential collapse, contact OWNER to prior to cleaning.

I. Removal (as applicable): Roots shall be removed in the sewer sections and manholes where root intrusion is a problem. Special attention should be used during the cleaning operation to assure almost complete removal of roots from the joints. Procedures may include the use of equipment such as high-velocity jet cleaners with specialty nozzles.

3.2 PREPARATION

A. Select, based on pre-construction CCTV inspection, cleaning equipment to address conditions of manhole and sewer lines at the time the work commences to adequately remove dirt, grease, rocks, sand, and other materials and obstructions from sewer lines and manholes to allow performance of other work. The equipment and methods selected shall be acceptable to the OWNER; however, acceptance of proposed method of cleaning does not relieve the Contractor of his responsibility to adequately clean the pipe to allow performance of other work.

1. Preliminary Cleaning (small amounts of debris existing within the sewer line): Use balls, scooters, high pressure water jetting (up to and including six (6) passes) equipment, brushes and swabs.
2. Heavy cleaning (large deposits of debris or heavy root growth existing within the sewer line): Use bucket machines, scrapers and augers. Cleaning which requires more than 6 passes with hydraulic cleaning equipment to achieve acceptable results shall be considered heavy cleaning.

B. Written authorization shall be requested and obtained prior to conducting any heavy cleaning. Authorization shall be required for each individual sewer reach. Heavy cleaning without prior authorization will not be paid for.

C. Equipment used shall be capable of removing scale, tuberculation, and mineral deposits.

D. Take satisfactory precautions to protect sewer lines from damage that might be caused by improper use of cleaning equipment. Whenever using hydraulically propelled cleaning tools that depend upon water pressure to provide their cleaning force, or any tools that retard flow of water in sewer line, take precautions to ensure that water does not cause damage or flooding to public or private property.

E. Sewers damaged as a result of the Contractor's improper operations shall be promptly repaired by the Contractor at no cost to the City. The Contractor shall immediately notify the City of any damages to the sewer system regardless of fault.

F. Any damage caused to public or private property as a result of such cleaning and preparation operations shall be restored to pre-existing conditions by the Contractor in a timely manner and at no additional costs to the City.

G. No fire hydrant shall be obstructed in case of a fire in area served by hydrant.

H. Remove water meters, piping, and related equipment from fire hydrants at end of each workday.

3.3 EQUIPMENT

A. Hydraulic Sewer Cleaning Equipment:

1. Equipment: movable dam type constructed so that a portion of the dam may be collapsed at any time during cleaning operation to protect against flooding of sewer.

a. Movable dam shall be same diameter as pipe being cleaned and shall provide flexible scraper around outer periphery to ensure total removal of grease. If sewer cleaning balls or other such equipment which cannot be collapsed instantly are used, take special precautions against flooding of sewers and public or private property.

B. High Velocity Jet (Hydrocleaning) Equipment:

1. Have a minimum of 500 feet of high-pressure hose.
2. Have a selection of two or more velocity nozzles that can produce a scouring action from 15 to 45 degrees in all size lines to be cleaned. Also include a high velocity gun for washing and scouring manhole walls and floor.
3. Be capable of producing a minimum of 80 gallons per minute flows from a fine spray to a long-distance solid stream and delivering up to 1000 psi. Be able to carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel. Locate controls so equipment can be operated above ground. Select flowrates and pressures as required for each size of sewer, type of debris, and amount of debris, and as recommended by nozzle manufacturers.
4. Have a water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
5. Have root cutting blades that are hydraulically spun.

C. Mechanical Cleaning Equipment:

1. Bucket machines shall be in pairs and with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe shall not be acceptable.
2. Power rodding machines shall be either sectional or continuous type capable of holding a minimum of 750 feet of rod. Rod shall be specifically treated steel. To ensure safe operation, machine shall have a fully enclosed body and an automatic safety release clutch or relief valve.

3.4 SAFETY

A. Contractor shall be solely responsible for safety during the performance of all Work. Contractor shall take satisfactory precautions to protect the sewer segments and appurtenances from damage that might be inflicted upon them using cleaning equipment. Any damage inflicted upon a sewer segment or other public or private property as a result of the Contractor's cleaning operations, regardless of the cleaning method used and regardless of any other circumstance which may contribute to the damage, shall be repaired by the Contractor at his sole expense.

B. Contractor shall not enter any sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated by Contractor and/or OWNER. Contractor shall perform all work in accordance with the latest OSHA confined space entry regulations. Contractor shall coordinate his work with local fire, police, and emergency rescue

units. Whenever hydraulically propelled cleaning tools, which depend upon water pressure to provide their cleaning force, or any tools which retard the flow of water in the sewer segment are used, precautions shall be taken by Contractor to ensure that the water pressure utilized does not result in any damage or flooding to public or private property being served by the sewer segment(s) involved.

3.5 APPLICATION

A. All sludge, dirt, sand, rocks, grease and other solid or semi-solid residue, debris, and material resulting from cleaning operations shall be removed at the downstream manhole of the section of sewer being cleaned. Passing material from manhole section to manhole section which could cause line stoppages, accumulations of sand in wet wells, or damage to pumping equipment shall not be permitted. In the event that sludge, dirt, sand, rocks, grease and other solid or semisolid material or debris resulting from the cleaning operations are observed and/or detected by OWNER as passing to downstream sewer segment(s), Contractor shall be responsible for cleaning such downstream sewer segment(s) at no additional cost to OWNER.

B. Provide appropriate screening to stop passing of materials into downstream sewers. Sludge, dirt, sand, rocks, grease, and other solid or semisolid residue, debris, and material resulting from cleaning operations shall be removed at downstream manhole of section of sewer being cleaned. Passing material from manhole section to manhole section which could cause line stoppages, accumulations of sand in wet wells, or damage to pumping equipment shall not be permitted.

C. Remove debris, residue, and other materials resulting from cleaning operations from site at end of each workday and shall be disposed of in an approved and lawful manner. Under no circumstances will accumulation of debris, residue, and other matter be permitted on site beyond stated time, unless prior written authorization is given for storage in totally enclosed containers. Transport all debris an approved facility, in accordance with all applicable local, state, and federal rules and regulations. All disposal fees shall be paid by the Contractor.

D. Continuously remove debris from the downstream manhole during sewer cleaning. Do not allow debris to be passed into the downstream sewer.

E. Decant excess cleaning water and direct it to the sewer downstream of the sewer being cleaned.

F. Flushing of sanitary sewers to facilitate cleaning activities without the capture of solids and debris is expressly prohibited.

G. Retrieval of equipment lodged in pipes, or a wet well is Contractor's responsibility and shall be performed at Contractor's expense.

H. Under no circumstances shall the removed sewage or solids be dumped onto streets or into ditches, catch basins, storm drains, sanitary or combined sewer manholes, or otherwise improperly disposed. If sewage is unintentionally spilled, discharged, leaked or other deposited in the open environment, Contractor shall be responsible for any clean-up and disinfection of the affected area. Contractor shall comply with all local, State and Federal regulatory requirements regarding spills.

I. The Contractor shall keep his haul route and work area(s) neat and clean and reasonably free of odor and shall bear all responsibility for the cleanup of any spill which occurs during the transport of cleaning/surface preparation by-products and the cleanup of any such material which is authorized by or pursuant to this Contract and in accordance with applicable law and regulations.

The Contractor shall immediately clean up any such spill or waste material release.

J. Cleaning Precautions: During sewer cleaning operations, satisfactory precautions shall be taken in use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard flow in sewer line are used, precautions shall be taken to ensure that water pressure created does not damage or cause flooding of public or private property being served by sewer. When possible, flow of sewage in sewer shall be utilized to provide necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, water shall be conserved and not used unnecessarily.

K. No sewer cleaning shall take place in a particular sewer segment until upstream pipe segments have been cleaned. If cleaning is done in a downstream pipe segment to facilitate overall cleaning operations, segment shall be re-cleaned at no additional cost to OWNER, after pipes upstream of that segment have been cleaned.

L. Sewer line walls shall be cleaned adequately to provide for proper operation of joint testing and sealing equipment or internal inspection to discern structural defects, misalignment, and infiltration/inflow sources. Cleaning shall be performed immediately prior to joint testing and sealing and internal inspection to preclude build-up of debris from infiltration/inflow sources and discharges from upstream pipeline sections.

M. Designated sewer manhole sections shall be cleaned using hydraulically propelled, high velocity jet, or mechanically powered equipment. If cleaning of an entire section cannot be successfully performed from one manhole, equipment shall be set up on other manhole and cleaning again attempted. No additional payment allowance shall be made for reverse set-ups. If, again, successful cleaning cannot be performed or equipment fails to traverse entire manhole section, it will be assumed that a major blockage exists, and cleaning effort shall be repeated with other types of equipment. Immediately report any blockages to OWNER.

N. Determine the location of major blockage(s) by measuring length of hose or rod inserted from manholes at each end and immediately report location of blockage(s) to OWNER. Contractor shall note these conditions in its field log.

O. Contractor shall recognize that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where damage could result if cleaning were attempted or continued. OWNER shall be immediately notified by Contractor of all conditions which in the opinion of Contractor warrant termination of cleaning activities. If Contractor's cleaning equipment becomes lodged in a sewer, it shall be removed by Contractor at his expense. This shall include excavation and repair of the sewer, underground utilities, backfilling, and surface restoration.

P. Water for sewer cleaning shall be purchased and obtained at locations in accordance with utility OWNER. If water is obtained from a potable supply, provide appropriate backflow prevention devices as required by authority having jurisdiction to protect potable system from cross connections and contamination. Prevent cross contamination of any public or private water systems used for this purpose.

3.6 FIELD QUALITY CONTROL

A. Acceptance of sewer line cleaning shall be contingent on satisfactory completion of the television

inspection. If television inspection shows the cleaning to be unsatisfactory, the sewer line shall be re-cleaned and re-inspected until the cleaning is shown to be satisfactory at no additional cost to the OWNER. In areas where television inspection is not performed, a double squeegee (with each squeegee the same diameter as the sewer) shall be pulled cleanly through each section between manholes as evidence of satisfactory cleaning.

B. If internal joint testing and sealing is to follow cleaning, give particular attention to adequacy of cleaning to ensure that proper seating of sealing packer can be achieved.

C. Inspection of cleaning operations will be made on a daily basis by the OWNER.

3.7 FINAL CLEANING

A. Upon cleaning of underground sewer lines or structures, removal debris from finish grade and clean work areas so conditions at conclusion of the work are equal to or better than areas prior to work of this Section.

END OF SECTION 330130.41

SECTION 330130.71 - CHEMICAL SEALING OF SERVICE LATERALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required to test, grout and retest all sewer services reinstated on CIPP lined segments. Service connection cleaning, testing and grouting shall be as described in this Section. All equipment shall enter the service connections from within the main sewer.

B. The annular space between host pipe and liner as well as the first joint within 24-inches of the service connection point shall be sealed with chemical grout following completion of the mainline lining and specified in this Section.

C. Related Requirements:

1. Section 330130.16 “TV Inspection of Sewer Pipelines” for Television Inspection of Sewer Lines.
2. Section 330130.41 “Cleaning of Sewers” for Sewer Line Cleaning.
3. Section 330130.72 “Cured-in-Place Pipe Lining”.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each gel compounds.

1.5 QUALITY ASSURANCE

A. Sealing shall be performed by a crew under the direct supervision of a superintendent who has a minimum of two years documented experience in the sealing procedures as specified herein and as considered standard in the sewer rehabilitation industry. Submit documentation of this experience with references for approval prior to the start of work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver uncured gel to site in unopened containers, with date of manufacture clearly indicated.

B. Do not use and remove from site, any uncured gel manufactured more than six months prior to date of application.

C. Use containers of uncured gel has been opened as soon as practically possible. Ensure that gel has not been contaminated if container of gel is not used within 24 hours of being opened. Remove from site and dispose of any contaminated gel.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Clean (including roots, mineral deposits, scaling, CIPP coupons, etc.), grout and test each service connection as required. Furnish and utilize such equipment as is necessary to conduct all of the work specified in this Section (except protruding taps and broken pipe replacement) from inside each service connection. Access to each service connection shall be from within the main sewer from the nearest sewer manhole. No access allowed from private properties.

2.2 MATERIALS

A. General

1. Mixing, handling, and application of chemical sealing materials shall be in strict accordance with the manufacturer's recommendations.
2. While being injected, the chemical sealant must be able to react/perform in the presence of water.
3. The cured sealing material must prevent the passage of water through the pipe joint and the annulus space to a minimum distance of 24 inches into the lateral. The sealing material must withstand submergence in water without degradation, remain flexible after curing, and must be able to withstand freeze/thaw and wet/dry cycles without adversely affecting the seal.
4. The cured sealant must be chemically stable and resistant to acids, alkalis and organics normally found in sewage, and must not be biodegradable.
5. Residual sealing materials must be easily removable from the sewer line to prevent reduction or blockage of sewage flow.
6. Handling, formulation and storage of the sealing gel compound shall be in strict conformance with the manufacturer's recommendations. The uncured gel shall be delivered to the site in unopened containers, with the date of manufacture clearly indicated, no uncured gel manufactured more than six months prior to the date of application shall be utilized. Any uncured gel compound determined to be more than six months old shall be immediately removed from the site. Once a container of uncured gel has been opened it shall be used as soon as practically possible. If the container of gel is not used within 24 hours of being opened, ensure that the gel has not been contaminated. Any contaminated gel shall be removed from the site and disposed of.

B. Acrylic base gel chemical sealing material shall have the following characteristics:

1. A minimum of 10% acrylic base material by weight in the total sealant mix. A higher concentration (%) of acrylic base material may be used to increase strength of set during injection.
2. The ability to tolerate some dilution and react in moving water during injection.
3. A viscosity of approximately 2 centipoise, which can be increased with additives.
4. A constant viscosity during the reaction period.
5. A controlled reaction time from 5 seconds to 6 hours.
6. The ability to increase mix viscosity, density, and gel strength by the use of additives.
7. Acrylic base gel chemical sealing material shall be Avanti AV-118 or equal.

C. Urethane base gel chemical sealing material shall have the following characteristics:

1. One part urethane prepolymer thoroughly mixes with between 5 and 10 parts of water weight. The recommended mix ratio is one part urethane prepolymer to 8 parts of water (11% prepolymer).
2. A liquid prepolymer having a solids content of 77% to 83%, specific gravity of 1.04 (8.65 lbs./gal.) and a flash point of 20 degrees F.
3. A liquid prepolymer having a viscosity of 600 to 1200 centipoise at 70 degrees F that can be pumped through 500 feet of hose with a 1000 psi head at a flow rate of 1 ounce per second.
4. Water used to react the prepolymer shall have a pH between 5 and 9.
5. A cure time of 80 seconds at 40 degrees F, 55 seconds at 60 degrees F, and 30 seconds at 80 degrees F, when 1 part prepolymer is reacted with 8 parts of water only. Cure time shall be adjustable by the use of additives to the reaction water.

D. Icoset shall be added to all chemical grout installed under this contract. The application shall be in accordance with the manufacturer's recommendations.

E. A representative of the grout manufacturer shall be on site for one day at the start of the project to assure that all requirements are met.

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to sealing the connection, the Contractor shall thoroughly clean the interior of the lateral of debris and foreign matter. Cleaning is to be adequate for seating a lateral packer in the mainline and inserting and seating an inflatable sealing bladder in the lateral. The lateral shall be cleaned of obstructions and roots on the length to be sealed.

B. The Contractor shall be prepared to bypass pump the sewage flow as part of his operation where the sealing procedures require such diversion. Where the sealing equipment is designed to allow the passage of flow, the flow shall be limited to that as recommended by the equipment manufacturer.

C. The service lateral testing and grouting shall be accomplished by first testing the service lateral joints followed by grouting of all reinstated service laterals on pipes CIPP lined. Each service lateral, which has been sealed, shall be retested to ensure the effectiveness of the work. Any service laterals, which fail, shall be resealed and retested until it passes the test before moving on to the next service lateral. Testing of joints which are visibly leaking infiltration will not be required.

D. The equipment shall consist of a closed-circuit television system and a sealing packer device along with the necessary chemical sealant containers, pumps, controls, regulators, valves, hoses, etc. The sealing packer shall be so constructed that it can straddle 4 to 6-in diameter service connections in 6-in or larger main sewer lines. When properly positioned and with the end elements inflated, an inflatable inversion sealing tube shall be extruded up the service lateral thereby isolating a portion of the service lateral containing one or more pipe joints for testing or sealing. The pumping unit, metering equipment, and the packer device shall be designed so that proportions and quantities of materials can be regulated in accordance with the type and size of the leak being sealed. Mainline packer and lateral bladder device shall be manufactured by American Logiball, Inc. or equal.

E. Testing shall be conducted by properly positioning the packer device in the main sewer line with the inversion tube extruded into the service lateral and performing an air test. This test shall be accomplished by applying a positive air pressure equal to 1/2 lb/ft of main sewer line depth into the created void area between the packer device and the extended end of the inversion tube, but not to exceed 10 psi. After the required test pressure has been displayed on the test meter above ground, the application of the air pressure shall be stopped and a 20 second test period shall commence. The test pressure meter shall be observed during the 20-second test period and should the pressure drop exceed 50 percent of the test pressure, the service lateral shall have failed the test and shall be sealed. Should it not be possible to develop the required air test pressure, then the service lateral shall also have failed the test and shall be sealed.

F. All lateral service lines shall be sealed internally by the use of the packer device. Either immediately following the air test or after the packer device has been properly positioned in the main line with the inversion tube extended into the service lateral, the lateral shall be sealed by the injection of the chemical sealant. The chemical sealant shall be injected through the packer device into the annular space between the inversion tube and the service lateral. The injection of chemical sealant shall continue until the chemical fluid back pressure is sufficient to ensure the complete sealing of all the defects along the length of the inversion tube. However, when the effective quantity of grout pumped exceeds one gallon per foot of sealing distance plus 3 gallons it will be suspected that there is unseen voids outside of the pipe and the applicator shall try to build grout dams by repetitively pumping and curing the grout until the area is dammed off and the refusal pressure is met. The amount of chemical per pump stroke shall be measured from time to time and then the number of pump strokes can be used to measure the amount of chemical delivered to each lateral.

G. Upon completion of the sealing operation, the service lateral shall be retested to ensure the effectiveness of the work. The retesting shall be accomplished using the same procedures previously described. Should the service lateral fail to pass the test, it shall be resealed and retested until the test requirements can be met.

H. After the service lateral has been successfully sealed and retested the following procedures shall be performed to ensure that the sealing operation did not block the service lateral.

1. The inversion tube shall be removed from the lateral.
2. The packer and elements shall remain inflated or be reinflated.
3. Air shall then be introduced into the service lateral line.

I. If during the injection of the air, no pressure build up is recorded on the pressure gauge the service lateral shall be considered free flowing. However, should air pressure build up indicating a partial or total blockage of the lateral it shall then be cleaned to restore proper flow.

J. Residual sealing materials that extend into the pipe, reduce the pipe diameter, or restrict the flow shall be removed from the joint. The sealed joints shall be reasonably flush with the existing pipe surface. It is the responsibility of the contractor to verify that the sealing of laterals did not restrain the flow and to remove any grout which would restrain flow. Lateral flow shall be verified after the sealing of each lateral. With the lateral being viewed with the pan and tilt camera, an attempt is made to obtain a water flush by the occupant. If the flow seems abnormal, it is assumed that the building sewer is blocked with grout and must be cleared.

K. Extreme caution shall be utilized during the testing and sealing operations in order to avoid damaging the existing sewer. If any damage occurs, it shall be repaired to the satisfaction of the Engineer with no additional cost to the OWNER.

L. After the work is completed, the Contractor shall perform a CCTV inspection of each lateral connection sealed and provide the OWNER and Engineer with a tape (digital copy) and written log and verification of each sealed connection test, retest and acceptance. The videos shall be provided on a portable hard drive device to be retained by the OWNER.

3.2 DISPOSAL

A. Furnish for collection of cleaning solvents used in cleaning of sealing equipment. Disposed of collected solvents by an approved solvent recovery process. Do not allow disposal of cleaning solvents into sewer system or into natural watercourses.

3.3 SEWER FLOW CONTROLS

A. When sewer line flows are above minimum requirements or inspection of complete periphery of pipe is necessary to effectively conduct inspection and sealing operations, use one or more of following methods of flow control.

1. Insert a sewer line plug into line at a manhole upstream from section to be inspected, tested and/or sealed. Designed plug so that sewage flows can be released. During inspection portion of operation, shut off or substantially reduce flows in order to properly inspect pipe at invert. After inspection is complete, restore flows to normal or not more than 1/4 of pipe diameter during joint testing and joint sealing operation.
2. Where pumping is required in the opinion of Engineer, to assure completion of inspection and sealing work, furnish pumping and by-passing equipment.

3.4 FIELD QUALITY CONTROL

A. Base field acceptance of chemical sealing of pipeline on Engineer's evaluation of appropriate installation and curing data along with review of television inspections.

B. Ensure zero groundwater infiltration of chemical sealing.

C. Ensure service connections are open and clear.

D. Perform following tests and inspections:

1. At discretion of Engineer, up to 10 sewer services that have been tested and sealed shall be randomly selected for retesting. If retesting reveals joint failure rate greater than 25 percent of original average sealing rate, provide written explanation of this occurrence. Engineer reserves right to continue retesting sewer services to determine if initial selection was an isolated case. If average failure rate for all retested sewer services is above 25 percent of original sealing rate, repeat sealing performed to date at no additional cost to OWNER.
2. If any defective chemical sealing is discovered after it has been installed, remove and replace with sound chemical sealing in a satisfactory manner at no additional cost to OWNER.

E. Prepare test and inspection reports.

END OF SECTION 330130.71

SECTION 330130.72 - CURED-IN -PLACE PIPE LINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish all labor, materials, equipment, and incidentals required to install and test the cured-in-place pipe (CIPP) lining and appurtenances and cured-in-place pipe short liners (CIPPSL) complete as needed, and as specified herein, including, but not limited to services necessary for traffic control, bypass pumping and/or diversion of sewage flows, cleaning and television inspection of sewers to be lined, liner installation, reinstatement of service connections, quality control, providing samples for performance of required material tests, final television inspection, testing of lined pipe system and warranty work, all as specified herein.

B. Sewer cleaning, pre-rehabilitation and post-rehabilitation CCTV inspection of all pipes to be rehabilitated by CIPP lining methods are required per applicable sections as listed in Paragraph 1.2.G of this Section.

C. Contractor shall remove obstructions and protruding service connections as required to complete the CIPP rehabilitation. Removal of all pipeline obstructions and protruding service connections required for sewer rehabilitation using cured-in-place pipe lining shall be completed prior to the pre-rehabilitation CCTV inspection.

D. Neither the CIPP system, nor its installation, shall cause adverse effects to any of the OWNER's processes or facilities. The use of the product shall not result in the formation or production of any detrimental compounds or by-products in the system or at the wastewater treatment plant. Notify the OWNER and identify any by-products produced as a result of the installation operations, test and monitor the levels, and comply with any and all local waste discharge requirements. Cleanup, restore existing surface conditions and structures, and repair any of the CIPP system determined to be defective. Conduct installation operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians, businesses, and property OWNERs or tenants.

E. The Contractor, or contractors performing the Work, shall not change any material, design values or procedural matters stated or approved herein, without informing the OWNER/Engineer and receiving written approval of the change. Such changes constitute a breach of contract and shall result in rejection and removal of work performed with the unapproved materials or processes at no cost to the OWNER.

F. Maintenance and Protection of Traffic, confined space entry, and work site protection shall be the responsibility of the Contractor and costs of these items are included in the cost of the project. Notify Police, Fire, Ambulance agencies, and residents/businesses in advance of any and all road closures. Comply with applicable OSHA trench safety rules and confined space and

sewer system entry. Also see Article 6.57 of the City of Providence Special Conditions.

G. Related Requirements:

1. Section 330130.16 “TV Inspection of Sewer Pipelines” for Pre and Post CCTV Inspection
2. Section 330130.41 “Cleaning of Sewers” for sewer line cleaning.
3. Section 331210 “Temporary Bypass Pumping Systems” for maintenance of flow in existing sewers and drains.
4. Section 333100 “Sanitary Utility Sewerage Piping” for Sewer testing.

1.3 SUBMITTALS

A. Submit to the OWNER/Engineer, in accordance with Section 013300 “Submittal Procedures”, product data, materials of construction, design calculations, and details of installation. The Contractor shall provide this information without delay or claim to any confidentiality. Contractor shall note that there are two different sets of submittals required with different time frames as shown below in Paragraphs 1.3.B. and 1.3.C.

B. Submittals required with bid or with contract shall include the following:

1. Letter to certify that the CIPP will conform to the project requirements as outlined in the Scope of Work and as delineated in these specifications and that the Contractor’s personnel have successfully installed a minimum of 250,000 feet (total) of proposed CIPP liner for a continuous period of at least three years installing CIPP liners in pipe of a similar size, length and configuration as contained in this contract as documented by verifiable references.
2. Submit information in following subparagraphs for review and approval before any CIPP lining work is performed.

    a. Number of years of Contractor’s experience in installing CIPP lining.
    b. Documentation and a sufficient number of references to meet qualifications requirements as listed in Paragraph 1.5 of this Section.
    c. Names and product information of the CIPP felt tubes and resin materials to be utilized for this project and their suppliers.
    d. A certified statement from the manufacturer that Contractor is an approved installer as certified and/or licensed by the CIPP liner manufacturer.

3. A list of a minimum of five municipal clients that CIPP Contractor has performed this type of work for without defects or performance problems for a period of five years after installation. The list shall contain the following:

    a. Names and telephone numbers of persons to be called to verify previous satisfactory performance.
    b. A full description of the actual work performed.
    c. Name of CIPP lining manufacturer and supplier for each referenced project.

4. Five (5) reports from projects within past two years from independent testing laboratory analysis of liner materials showing: Modulus of elasticity as determined by appropriate ASTM standard and flexural stress as determined by ASTM D790 standard. Lining shall

be of same resin system and felt tube materials as proposed for this project.

C. Submittals required within 10 days after notice to proceed shall include the following:

1. Detailed information on the CIPP installation procedures (wet-out, heating, curing, and cool down, if applicable) and all tools and equipment required for a complete installation. Identify which tools and equipment will be redundant on job site in the event of equipment breakdown. Equipment to be furnished for the project, including proposed back-up equipment, shall be clearly described. Contractor shall outline the mitigation procedure to be implemented in the event of key equipment failure during the installation process.
2. CIPP lining schedules including field-verified lengths and diameters of all CIPP lining and appurtenances required. Plans should include map(s) that show insertion points for all CIPP installations.
3. Shop drawings and product data to demonstrate compliance with these specifications and identify materials of construction (including resins, catalysts, felt, etc.), felt manufacturer, location of the felt manufacturing facility, location of the wet-out facility, etc., flexible membrane (coating) material (including recommended repair/patching procedure, if applicable).
4. Manufacturers' shipping, storage and handling recommendations for all components of the CIPP System.
5. MSDS sheets for all proposed products and materials to be furnished for the project.
6. Detailed sample collection, laboratory testing and quality control procedures, including schedule and shipping and storage requirements.
7. Written description and/or plan for odor control that will ensure that project specific odors such as styrene will be minimized at the project site and surrounding area.
8. The end seal material(s) and description of their installation.
9. Detailed written plan of the method of flow maintenance (Bypass Pumping plan) and noise prevention measures.
10. A detailed description of the Contractor's proposed procedures for removal of any existing blockages in the pipeline that may be encountered during the cleaning process.
11. A detailed written traffic-control plan that details every street that will be impacted and how impacts will be mitigated.
12. Data on the maximum allowable stresses and elongation of the tube during installation and the means in which the Contractor will monitor stress and elongation (i.e., ideal inversion head and maximum cold head, minimum inversion head, maximum hot head).
13. A detailed public notification plan shall be prepared and submitted including detailed staged notification to residences affected by the CIPP installation.
14. A complete description of the proposed wet-out procedure for the proposed technology.
15. A Safety Plan identifying all competent persons, a description of a daily safety program for the job site and all emergency procedures to be implemented in the event of a safety incident. All work shall be conducted in accordance with the Contractor's submitted Safety Plan. All work shall be conducted in accordance with the Contractor's submitted Safety Plan.

16. A detailed quality control plan (QCP) that fully represents and conforms to the requirements of these specifications. At a minimum the QCP shall include the following:

    a. A detailed discussion of the proposed quality controls to be performed by the Contractor.
    b. Defined responsibilities of the Contractor's personnel for assuring that all quality requirements for this contract are met. These shall be assigned by the Contractor, to specific personnel.
    c. Proposed procedures for quality control including those pertaining to fit and finish, and product sampling and testing shall be defined and submitted as part of the plan.
    d. Proposed methods for product performance controls, including method of and frequency of product sampling and testing both in raw material form and cured product form.
    e. A schedule for performance and product test result reviews between the Contractor and OWNER/Engineer at a regularly scheduled job meeting.
    f. Inspection forms and guidelines for quality control inspections shall be prepared in accordance with the standards specified in this contract and submitted with the QCP.

17. Design data and specification data sheets listing all parameters used in the CIPP liner design and thickness calculations based on ASTM F 1216 for "fully deteriorated gravity pipe conditions." Thickness of liners for oval and egg-shaped pipe shall be calculated in accordance with the "Sewerage Rehabilitation Manual" published by the Water Research Center (WRC). All calculations shall be prepared under the supervision of and stamped by a professional engineer registered in the State of Rhode Island.

D. Submittals <u>before, during and after CIPP installation work</u> shall include the following:

1. Prior to each shipment of CIPP lining, submit certified test reports that the CIPP lining for this Contract was manufactured and tested in accordance with all ASTM Standards specified and referenced herein.
2. CIPP lining schedules including field-verified lengths and diameters of all CIPP lining and appurtenances required to show that the contractor has physically measured every pipe to be rehabilitated. Plans should include map(s) that show insertion points for all CIPP installations.
3. Detailed installation procedures and manufacturer's recommended cure method for each diameter and thickness of CIPP liner to be installed, including CIPP lining production schedule, acceptable inversion heads and pressures, inversion or winching procedures, curing and cool-down procedures detailing the curing rate of temperature increases and cool down and the method of application, and times for each stage of the process.
4. Wet-out forms/reports for each CIPP segment with detailed information including but not limited to: date and time of wet-out, wet-out facility address, volumes and/or weights of resin, length and diameter of CIPP liner (both wet-tube and dry-tube), roller gap settings, start times, finish times, resin used (product name and batch/shipment number) and quantity, gel times, resin injection locations, thickness of CIPP liner (dry and wet), catalyst(s) name and quantity used, and any other pertinent data documenting the wet-out for each section of CIPP liner manufactured. The wet-out forms shall be submitted prior to CIPP liner installation and shall be provided without delay or claim to any confidentiality. Wet out forms shall be submitted to the OWNER/Engineer field

representative on the day of delivery.

5. CIPP liner field curing reports documenting the liner installation for all sewer segments. The CIPP liner reports shall document all details of liner installation, including manhole numbers, street names/sewer location, project number, date, time, ambient temperature, heads used during the inversion process, pressures and/or heads (minimum inversion pressure, ideal head, maximum hot head and maximum cold head) used during curing (including cool down if applicable), curing temperature, curing time, rate of cool down, CIPP liner thickness, etc. A sample report shall be submitted to the OWNER/Engineer for approval prior to the installation of any CIPP lining. The reports shall be submitted prior to requesting payment and shall be provided without delay or claim to any confidentiality.
6. Complete certified copies of the report(s) output(s) of the continuous temperature monitoring systems used in the control of the curing, printed and in electronic format. The reports shall be submitted prior to requesting payment and shall be provided without delay or claim to any confidentiality. Also provide the OWNER/Engineer with access to the website where the secure reports can be obtained.
7. Pre-rehabilitation and post-rehabilitation closed-circuit television (CCTV) inspection data as further defined herein. Post-rehabilitation CCTV inspection data shall be submitted within one week after the CIPP segment is installed.
8. Samples of installed liner(s) for testing to be performed by an ASTM-certified independent testing laboratory, as described further herein.
9. Information on any grouts, epoxy, or cements the Contractor is proposing to use for sealing at manholes or for other uses.
10. Submittals shall be provided in three-ring binders and/or electronic format.
11. Submit daily production reports to the OWNER/Engineer's Superintendent and/or field representative at the end of each workday.
12. A list of all service laterals (with distances and clock position) that were abandoned or reconnected as part of the work as further defined herein.
13. Some installations may result in the need to repair or replace a defective CIPP. The Contractor shall submit in writing, for review by the OWNER/Engineer, specific repair or replacement procedures for potential defects that may occur in the installed CIPP. Repair/replacement procedures shall be as recommended by the CIPP system manufacturer and shall be submitted to also include the following:

    a. Defects in the installed CIPP that will not affect the operation and long-term life of the product shall be identified and defined.
    b. Repairable defects that may occur in the installed CIPP shall be specifically defined by the Contractor based on manufacturer's recommendations, including a detailed step-by-step repair procedure, resulting in a finished product meeting the requirements of these contract specifications. Repairable defects may include but are not limited to blisters, wrinkles, fins, pinholes, over- or under-cut lateral connections, and any voids found between liner and the host pipe.
    c. Un-repairable defects that may occur to the CIPP shall be clearly defined by the Contractor based on the manufacturer's recommendations, including a recommended procedure for the removal and replacement of the CIPP. Un-repairable defects may include but are not limited to thickness below required minimum thickness, structural strength below required limits, lifts, shrinkage, folds, bulges, and delamination.

14. A list of all repair or replacement of CIPP defects that were executed by the contractor including identification of segment, location of the repair, and type of repair.

E. Public Notifications: Provide 48 hour notice prior to the assessment of any pipe segment, distribute door-to-door a door hanger, approved by the OWNER and Engineer, describing the work to be performed to notify the OWNER of every property, including residences and businesses, that may be affected. Include necessary information on bypass pumping how long residents may be unable to utilize the sewer. Door hangers shall be double-sided with the notification information in the English language on one side and in the Spanish language on the reverse side. Affected properties shall include, but not be limed to, properties on which:

1. A sewer to be accessed is located.
2. A manhole for accessing a sewer to assessed is located.
3. An existing sewer easement that could be used to access the sewer is located.
4. A temporary right-of-entry agreement with the property OWNER and the contractor for accessing a sewer or manhole on the property.
5. An existing sewer lateral serving the property directly connects to a sewer to be assessed or manhole to be accessed for the sewer assessment.

1.4 QUALITY ASSURANCE

A. Contractor performing CIPP lining work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by CIPP lining manufacturer. Contractor's personnel shall have successfully installed a minimum of 250,000 feet (total) of proposed CIPP liner for a continuous period of at least three years installing CIPP liners in pipe of a similar size, length and configuration as contained in this contract as documented by verifiable references. Submit name and experience of each lead individual performing work on this Contract. Personnel replaced by Contractor shall have similar verifiable experience as personnel originally submitted for project.

B. Full-time, on-site superintendent/foreman that will supervise CIPP lining installation shall have successfully installed a minimum of 100,000 feet (total) of proposed size range of CIPP liner for a period of at least two years as documented by verifiable references.

C. Lead personnel including superintendent, foreman and lead crew personnel each shall have a minimum of three years of total experience with CIPP technology proposed and shall have demonstrated competency and experience to perform the scope of work as documented by verifiable references.

D. OWNER and/or Engineer reserves the right to approve or disapprove Contractor, Superintendent, and/or manufacturer based on submitted qualifications and a follow-up interview.

E. CIPP felt and resin manufacturer(s) shall have successfully supplied a minimum of 500,000 feet of proposed liner and one million pounds of resin as documented by verifiable references.

F. The lateral cutter is required to have at least 12 months of experience reinstating the connection between the sewer main and lateral lining as documented by verifiable references.

G. CIPP linings shall follow the quality control plan submitted by Contractor.

H. CIPP linings shall be from a single manufacturer. Suppliers shall be responsible for provisions of all test requirements specified herein as applicable. In addition, CIPP lining to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by OWNER. Contractor shall require manufacturer's cooperation with these inspections. Cost of plant inspection of all CIPP lining approved for this Contract will be the responsibility of OWNER.

I. Inspections of CIPP lining may also be made by Engineer or other representatives of OWNER after delivery. CIPP lining shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample CIPP lining may have been accepted as satisfactory at the place of manufacture. CIPP lining rejected after delivery shall be marked for identification and shall be removed from the job site.

J. In the event that an installation is rejected based on review of the post-rehabilitation CCTV inspection, the Contractor shall repair the sewer segment to the satisfaction of the OWNER/Engineer at no additional cost to the OWNER.

K. Along with the physical properties testing and post installation CCTV survey, the Contractor shall deliver a certified copy of the curing report output from the temperature monitoring system used in the control of the curing process for pipes; or provide the OWNER/Engineer with access to the website where the secure report can be obtained.

1.5 GUARANTEE

A. CIPP lining installed shall be guaranteed by Contractor and manufacturer for a period of two years from date of Substantial Completion. All CIPPSL's shall be guaranteed by the Contractor for a period of two years from the date of acceptance. During this period, serious defects discovered in CIPP lining, as determined by OWNER and which may materially affect the integrity, strength, function and/or operation of pipe, shall be removed and replaced as recommended by the manufacturer in a satisfactory manner by Contractor at no cost to OWNER. OWNER may conduct an independent CCTV inspection, at its own expense, of CIPP lining work prior to completion of warranty period. Defects replaced at that time shall be fully warrantied by Contractor and manufacturer for a period of two years from date the defect was repaired. Wrinkles in flow stream, blisters that may affect the longevity of CIPP liner, dry spots where liner tube has no resin saturation, or other defects that may affect the integrity or strength of the CIPP or the flow capacity of the pipe, are unacceptable. Contractor shall be responsible to remove and repair, at Contractor's expense, all such defects in a manner that is satisfactory to OWNER/Engineer. Defects also include but not limited to the following:

1. Leakage through the liner or between liner and pipe.
2. Reduction of liner thickness of more than ten percent (10%) of the thickness designed and/or required. Final liner thickness shall be delivered by Contractor based on installed product physical properties and as specified in Contract requirements.
3. Separation of liner from host pipe where an annular space is clearly noticed, shrinkages (longitudinal and/or circumferential), dry spots, delamination of liner, cured lifts, dry spots, bulges due to external loading, reverse curvatures, splits, cracks, lifts, breaks, folds, major wrinkles (as defined further herein), flats, pinholes, crazing and any other defects that in the CIPP lining will compromise the longevity of the installed product.
4. Circumferential defects (wrinkle, fin, bulge, etc.) in the invert of pipe between 4:00 and 8:00 o'clock shall not exceed three percent of the host pipe diameter or 1/2-inches by

visual measurement, whichever is smaller, at the discretion of the OWNER.

5. Longitudinal wrinkles or fins shall not exceed maximum allowable height of five percent of equivalent host pipe diameter or 1-inch, whichever is smaller.
6. Structural strength below the required limits

1.6 DELIVERY, STORAGE, AND HANDLING

A. Care shall be taken in shipping, handling and laying to avoid damaging the CIPP liner. CIPP liner damaged beyond repair in shipment shall be replaced as directed by OWNER/Engineer.

B. Any CIPP liner showing a visible split, tear, or defect, shall be repaired per manufacturer's recommendations and to the satisfaction of the Engineer or, if not possible, shall be removed at once from the project site.

C. While stored, CIPP shall be adequately supported and protected in a manner as recommended by manufacturer.

D. CIPP liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. CIPP liner shall be protected from UV light. CIPP liner showing evidence of premature curing will be rejected for use and shall be immediately removed from the site.

PART 2 - PRODUCTS

2.1 CIPP FELT LINER AND RESIN

A. CIPP liner shall be Inliner by Layne Inliner, Inc., Insituform by Insituform Technologies, Inc., National Liner by National EnviroTech Group LLC, SAK Liner by SAK Construction LLC, SteamCure by Applied Felts, Sancon CIPP by Sancon Engineering Inc., Improved Technologies Group, or pre-approved equal. CIPP liners cured by UV light will not be allowed on this project.

B. CIPP liner shall be composed of tubing material consisting of one or more layers of a flexible non-woven polyester felt with or without additives such as woven fiberglass or other fibers and meet the requirements of ASTM F 1216, ASTM F 1743, and ASTM D 5813. Felt content of CIPP liner shall be determined by Contractor, but shall not exceed 15 percent of the total impregnated liner volume. Fabric tube shall be capable of absorbing and carrying resins, constructed to withstand installation pressures and curing temperatures and stretch to fit irregular pipe sections. Contractor shall submit certified information from felt manufacturer on normal void volume in the felt fabric that will be filled with resin.

C. CIPP liner tube may be made of single or multiple layer construction, with any layer not less than 1.5 mm thick, unless the tube is made of fiberglass material. Wet-out fabric tube shall have a uniform thickness and void space for resin distribution that when compressed at installation pressures will produce a predictable finished thickness that meets or exceeds the design thickness after cure.

D. No material shall be included in fabric tube that may cause de-lamination in cured CIPP. No dry

or unsaturated layers shall be acceptable upon visual inspection as evident by color contrast between felt fabric and activated resin containing a colorant.

E. Wall color of interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made. Hue of the color shall be dark enough to distinguish a contrast between fully resin saturated felt fabric and dry or resin lean areas.

F. Seams in the fabric tube, if applicable, shall meet the requirements of ASTM D5813.

G. The outside layer of the tube shall be coated with an impermeable material compatible with the resin and fabric.

H. Resin: Shall be a corrosion resistant polyester or vinyl ester resin and catalyst system or epoxy and hardener system manufactured specifically for sewer rehabilitation, that, and when properly cured within the tube composite, meets the requirements of ASTM F 1216, ASTM F 1743 or ASTM F 2019, the physical properties herein, and those, which are to be utilized in the design of CIPP for this project. Resin shall produce CIPP that will comply with or exceed structural and chemical resistance requirements of this specification. Liner material and resin shall be completely compatible. Generally, resin shall not contain fillers, except those required for viscosity control or fire retardance or increase strength, and with applications for which inert fillers would facilitate better heat transfer and retention during installation. Liner contractor may add up to 5 percent by mass, a thixotropic agent for viscosity control, which will not interfere with visual inspection.

I. Resins may contain pigments, dyes, or colorants, which shall not interfere with visual inspection of cured liner. Quantity of resin used for tube impregnation shall be sufficient to fill volume of air voids in tube with additional allowances for polymerization shrinkage and loss of resin through cracks and irregularities in original pipe wall. Use serial vacuum impregnation or pressure impregnation process (or equal) to provide maximum resin impregnation throughout the tube.

J. Prior to inversion, if applicable, outside and/or inside layer of tube (before inversion/pull-in as applicable) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate, if applicable, vacuum impregnation and monitoring of resin saturation during the resin impregnation (wet out) procedure.

K. Exterior of manufactured tube shall have distance markings along its length at regular intervals not to exceed 5 feet. Use these marks as a gauge to measure elongation during insertion. Should overall elongation of a reach exceed 5 percent, liner tube shall be rejected and replaced.

L. Identify the wet-out facility where all CIPP liner under this Contract will be manufactured. All CIPP liner shall be manufactured from this designated wet-out facility throughout entire Contract unless specifically approved otherwise by Engineer in writing. Multiple wet-out facilities shall not be allowed.

M. OWNER and/or an agent of OWNER may inspect CIPP liner during manufacturing and wet-out. OWNER/Engineer shall be given an opportunity to witness manufacturing of all CIPP liner for this project. OWNER is responsible for costs associated with witnessing the manufacturing of CIPP liner.

N. If OWNER/Engineer decides to inspect the manufacturing of CIPP liner, Contractor shall provide full access to witness wet-out process and shall provide any and all information related to the manufacturing as requested by OWNER or OWNER's agent without delay and without claims of confidentiality or product privacy.

O. Application of resin to felt tubing (wet-out) shall be conducted under factory conditions using vacuum impregnation and materials shall be fully protected against UV light, excessive heat and contamination at all times. If on-site wet out is required, Contractor shall be required to maintain ambient conditions similar to those encountered during factory wet outs.

P. Liners that are impregnated at the factory and transported to the project site in refrigerated trucks shall be installed as soon as possible and no more than two (2) weeks after the date of impregnation at the factory.

Q. When cured, CIPP liner shall form a continuous, tight-fitting, hard, impermeable liner that is chemically resistant to any chemicals normally found in domestic sewage per Table 2.1 in ASTM F 1216. CIPP liner shall be chemically resistant to trace amounts of gasoline and other oil products commonly found in municipal sewerage and soils adjacent to sewer pipe to be lined.

R. CIPP liner tube shall be manufactured or fabricated to a size that will tightly fit internal circumference of sewer being rehabilitated after being installed and cured. CIPP liner shall be capable of fitting into irregularly shaped pipe sections and through bends and dips within the pipeline. Allowance for longitudinal and circumferential expansion shall be taken into account when sizing and installing CIPP liner. Tube shall be properly sized to diameter of existing pipe and length to be rehabilitated and be able to stretch to fit irregular pipe sections and negotiate bends. Determine minimum tube length necessary to effectively span designated run between manholes. Verify lengths in field prior to ordering and prior to impregnation of tube with resin, to ensure that tube will have sufficient length to extend entire length of the run, which is defined as the length of the existing host pipe measured from the interior walls of the manholes, and/or from the ends of the pipe when/if the pipe extends into the manholes. Also measure inside diameter and circumference of existing pipelines at face of each manhole in field prior to ordering liner so that liner can be installed in a tight-fitted condition with little or no wrinkling.

S. Length of CIPP liner shall be as deemed necessary by Contractor to effectively carry out insertion of CIPP liner and sealing of CIPP liner at outlet and inlet manholes. Required diameter and length of each pipe segment shall be measured in advance of wet-out and a list of these measurements shall be submitted to Engineer at least one week prior to installation of each CIPP liner.

T. Contractor shall be responsible for ensuring that correct liner is installed in each sewer reach being rehabilitated.

U. All pipes of diameter 12-in and greater shall have a minimum finished thickness of 6mm or as designed, whichever is greater.

V. Verify proposed CIPP liner thicknesses and submit associated calculations. Actual cured liner thickness shall be -5/+10 percent of approved design thickness and shall not include thickness of any non-structural membrane (inner/pre- liner). CIPP liner shall be designed in accordance with applicable provisions of ASTM F 1216 for "fully deteriorated gravity pipe conditions", unless Engineer agrees, in writing, prior to installation that "partially deteriorated gravity pipe conditions" shall apply based upon review of CCTV video. CIPP liner shall meet following

design conditions, unless Engineer agrees, in writing, of their change:

1. AASHTO H 20 Live Load.
2. Constrained soil modulus of native soil in the pipe zone of 1,000 psi.
3. Soil weight of 120 pounds per cubic foot and a coefficient of friction of Ku'=0.130r shall be used for the installed depths.
4. Long-term flexural modulus used in design calculations shall be estimated by multiplying lowest short-term flexural modulus used in design calculations by a retention factor of 0.50 (i.e., long-term retention of mechanical properties equal to 50 percent.)
5. Design safety factor of 2.0.
6. Typical groundwater levels shall be estimated at the ground surface. If actual groundwater depth information is available from USGS or other sources, it shall be utilized in calculations. Groundwater depth used in calculations should be from the estimated maximum groundwater level from surface to invert of the interior pipe or at elevation specified for bidding purposes in Contract Documents.
7. Service temperature range shall be 40 to 100 degrees F.
8. Minimum ovality of host pipe of two (2) percent.
9. Long-term retention of mechanical properties equal to 50 percent.
10. Thickness to be used for CIPP liner shall be largest thickness as determined by calculations for deflection, bending, buckling and minimum stiffness.
11. CIPP liner thickness for non-round pipes or circular pipes with greater than 10% ovality shall be designed on accordance with WRc Sewerage Rehabilitation Manual, Type II Design, Section 5.3.2.iii.
12. Minimum liner thickness after installation and curing for all pipes 12-in in diameter and larger shall be 6 mm or as designed, whichever is greater. Thicknesses following installation and curing shall be based on design calculations provided by Contractor.
13. CIPP liner shall provide a minimum service life of 50 years and, for design purposes, shall have the following minimum initial and long-term properties:

Property	Test Method	Initial (psi)	Long Term (psi)
Flexural Strength	ASTM D 790	4,500	2,250
Flexural Modulus of Elasticity	ASTM D 790	350,000	175,000

14. The CIPP shall be designed to withstand all imposed loads, including dead and live loads and, if applicable, hydrostatic pressure. The liner shall have sufficient wall thickness to withstand all anticipated external pressures and loads that may be imposed after installation.

2.2 END SEALS

A. End seals shall be composed of hydrophilic rubber and molded as a one-piece, three-inch wide cylinder which when installed will form a 360-degree seal between the host pipe and the newly installed liner. Use of caulking, rope or band type of an end seal shall not be allowed. Hydrophilic end seals shall be Insignia End Seals by Municipal and Contractors Sealing Products, 7740 Reinhold Drive Suite C, Cincinnati, Ohio 45237, 513-482-3300, or approved equal.

2.3 CIPPSL HEAT-CURED: FIBERGLASS/POLYESTER FELT REPAIR MATERIAL

A. The CIPPSL shall be a resin impregnated fiberglass/polyester felt sleeve which is wrapped around an inflatable packer and positioned in the sewer to be rehabilitated and cured in place by circulating hot water to cure the resin.

B. The CIPPSL sleeve shall be fabricated from a minimum of two layers of fiberglass with a single layer of polyester felt sandwiched between the fiberglass layers. The material shall be sewn together with multiple polyester threads using zigzag stitching spaced evenly over the full width of the material. The three layer composite reinforcement material shall have a minimum mass of 40.6 oz/sq yd with a thickness not less than 0.24-in. Fiberglass alone shall not be acceptable.

C. The fiberglass shall be woven roving having a minimum weight of 24 oz/sq yd and shall be made of "E" glass coated with a sizing compatible with the resin being used.

D. The polyester felt shall be needle punched and have a minimum weight of 16.5 oz/sq yd.

E. The resin shall be a two-part epoxy type liquid thermosetting resin suitable for the intended use as well as the proposed curing method. The diluted epoxy resin shall contain at least 60 percent of bisphenol A, 10 to 20 percent of bisphenol F with the remainder of the mixture being a diluent. Epoxy resin shall be D.E.R. (R) 353 by the Dow Chemical Company; ME 948 by Micon or equal.

F. The epoxy resin shall be brought on site in the resin manufacturer's original containers. Each container shall be clearly labeled as to contents and product data. The resin shall be stored, mixed and applied in accordance with the manufacturer's recommendations.

G. The CIPPSL shall provide a service life of 25 years and shall have, as a minimum, the initial and long term properties listed below.

MECHANICAL PROPERTY	INITIAL	LONG-TERM
Flexural Strength	8,000 psi	-------
Flexural Modulus of Elasticity	280,000 psi	140,000 psi
Tensile Strength	5,000 psi	------
Tensile Modulus of Elasticity	280,000 psi	140,000 psi

H. When cured, the CIPPSL shall form a continuous, tight-fitting, hard, impermeable liner which is chemically resistant to any chemicals normally found in domestic sewage. The CIPPSL shall have a suitable membrane coating for protection of the interior surface and to provide a uniform, smooth flow surface. No membranes or plastic coating shall be allowed between the repair patch and the pipe wall.

I. The fiberglass/polyester felt sleeve shall be fabricated to a size that will tightly fit the sewer being rehabilitated after being installed and cured. The transition from the patch to the existing pipe must be smoothly tapered.

J. The CIPPSL shall be by Avanti International of Webster, TX, AP/M Permaform of Johnston, IA, or equal.

K. Thickness of the cured liner shall be as recommended by the manufacturer, but shall not exceed 1/4-in when cured unless authorized in writing by the Engineer.

L. Spot repairs shall have a minimum length of 3-ft and shall not exceed 30-ft in length. CIPPSL lengths shall extend a minimum of 1-ft beyond the pipe defects at each end of the repaired section. Length of each required repair shall be verified in the field prior to installation.

M. CIPPSL shall not begin or end at a pipe joint.

N. All cured-in-place spot repairs shall be one piece. Separately fabricated or installed CIPPSL's utilizing overlapped or "butted" ends shall not be acceptable.

2.4 CIPPSL AMBINENT-CURED MATERIAL

A. The CIPPSL tube will consist of one or more layers of flexible non-woven needled felt or a reinforced non-woven material. The tube will be continuous in wall thickness based upon design calculations found in ASTM F1216 appendix IX.

B. The CIPPSL tube shall be compressible material at each end forming a smooth transition to the host pipe.

C. The liner will be capable of confirming to offset joints, bells, and disfigured pipe sections.

D. The resin will be polyester or, or vinyl-ester with proper catalysts as designated for the specific application.

E. The CIPPSL shall be by LMK Technologies of Ottawa, IL or equal.

F. Thickness of the cured liner shall be as recommended by the manufacturer, but shall not exceed 1/4-in when cured unless authorized in writing by the Engineer.

G. Spot repairs shall have a minimum length of 3-ft and shall not exceed 30-ft in length. CIPPSL lengths shall extend a minimum of 1-ft beyond the pipe defects at each end of the repaired section. Length of each required repair shall be verified in the field prior to installation.

H. CIPPSL shall not begin or end at a pipe joint.

I. All cured-in-place spot repairs shall be one piece. Separately fabricated or installed CIPPSL's utilizing overlapped or "butted" ends shall not be acceptable.

MECHANICAL PROPERTY	INITIAL	LONG-TERM
Flexural Strength	4,500 psi	-------
Flexural Modulus of Elasticity	250,000 psi	-------

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine OWNER's CCTV video of each pipe segment before starting work.

B. Notify all property OWNERs or businesses that discharge sewage directly to sewer being lined and whose service lateral will be affected by lining work, that their service will be temporarily discontinued during installation of CIPP liner. Deliver written notification to each such resident or business at least 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted, and any restrictions on use of sewage system facilities including exact days and hours when sewer system cannot be used. Method of notification, and the text included in the notification, shall be approved by OWNER.

C. The Contractor shall expose all buried manholes to facilitate lining work.

D. Clean each length of pipe to be lined and dispose of all resulting residual material offsite in a manner acceptable to OWNER/Engineer.

E. Conduct a pre-rehabilitation CCTV inspection of all sewers to be rehabilitated by CIPP lining methods in accordance with Sections 330130.16 “TV Inspection of Sewer Pipelines.” Inspection shall be for purpose of identifying defects in pipe, to document location of all service lateral connections, and to confirm point repair locations. The Contractor’s project manager and/or superintendent shall review the pre-rehabilitation inspection videos to confirm the quality of the videos, locations of lateral connections, and locations of point repairs to be performed; only after the Contractor has confirmed that the quality of the videos is adequate for a clear review of pipeline, shall be submitted to the Engineer. Engineer will review pre-rehabilitation inspection videos to confirm locations of point repairs to be performed by Contractor. If an Inspector or Engineer is on site or immediately available, Contractor shall allow the Inspector or Engineer to view the pre-installation video to verify the pipe is ready for CIPP installation which includes proper cleaning, trimming protruding taps and mitigating and significant infiltration.

F. If the data is available, OWNER/Engineer will provide Contractor information on location of known active laterals and cleanouts; however, this list may not be interpreted as all-inclusive. Contractor shall be responsible for verifying active customer service connection prior to rehabilitation. Contractor shall compare service connections from CCTV video and compare with above ground measurements at approximate location of center of each house or building. Any discrepancies between CCTV data and above ground measurements of laterals shall be brought to attention of OWNER/Engineer for a determination of lateral reinstatements. If Contractor discovers an error or addition to the list provided, Contractor shall immediately notify Engineer for additional investigation. Upon completion of rehabilitation work, a list of all service laterals abandoned or reconnected as part of the work shall be submitted to OWNER. Compiled list can be in the form of post-inspection installation inspection logs and shall include the following information:

1. Location of each service lateral based on CCTV inspection logs. Location shall include both accurate distance measured from centerline of starting manhole as well as a notation (by clock-reference) of where on circumference of pipe, the service lateral connects.
2. Status (Active or Inactive).
3. Address of each customer and associated active lateral location.

G. During pre-rehabilitation CCTV inspection and prior to installation of CIPP lining, all service lateral connections protruding into main line by 1/2 inch or more shall be internally cut or ground down flush with pipe wall with a robotic cutter specifically designed for this purpose. Internal cutter shall be capable of cutting unreinforced concrete pipe (CP), cast iron pipe, PVC, vitrified clay pipe (VCP), ductile iron pipe, and Orangeburg pipe. All materials / cuttings shall

be removed from sewer and properly disposed of.

H. Infiltration runners or gushers as defined by NASSCO PACP that are observed during the pre-rehabilitation CCTV shall be stopped by injecting a chemical hydrophilic grouting as required in Section 330130.71 "Chemical Sealing of Pipelines" using a remote packer, unless otherwise approved by the Engineer. If the pipe is larger than 36", man-entry with hand-applied fast-setting epoxy can be performed to stop the infiltration.

I. Maximum amount of time any home or business shall be without sanitary sewer service is 10 hours and not between 6:00 PM and 8:00 AM. Any service out longer than 10 hours shall be bypassed to a sanitary sewer at no cost to OWNER.

J. Provide bypass pumping of sewage flows in accordance with Section 331210- "Temporary Bypass Pumping Systems". Service connection effluent may be plugged only after proper notification to affected residence and may not remain plugged overnight. Installation of liner shall not begin until Contractor has installed required plugs or a sewage by-pass system and all pumping facilities have been installed and tested under full operating conditions including bypass of mainline and side sewer flows. Once lining process has begun, existing sewage flows shall be maintained, until resin/felt tube composite is fully cured, cooled down, fully televised and CIPP ends finished.

K. Wastewater flows from existing sewers shall not be allowed to enter the new or rehabilitated facilities until the new or rehabilitated facilities have been cleaned and tested as required in the Contract Documents.

L. Provide CIPP liner in full length of sewer as shown on work orders. Installation of CIPP liner shall be in complete accordance with applicable provisions of ASTM F 1216 or ASTM F 1743 and manufacturer's recommendations.

M. Install a hydrophilic end seals at face of each manhole at all manhole penetrations per Paragraph 2.2 prior to inverting or pulling in uncured CIPP liner.

N. If in the opinion of CIPP liner manufacturer and/or the OWNER/Engineer, rate of infiltration in sewer segment is high enough to risk washout of resin, perform measures, as required, to minimize infiltration prior to installation, including pre-liners, grouting, etc. If during pre-lining CCTV inspection, any infiltration runners or gushers (per NASSCO PACP®) are observed, Contractor shall submit, in writing for approval by OWNER/Engineer, methods and materials for mitigating any adverse impacts from the infiltration.

O. Pressure gauges for the ends shall be digital pressure/vacuum gauges with a pressure range of 0 to 50 psi and ±0.25% test gauge accuracy.

P. Edit the diameter for which continuous temperature sensor strips will be required per OWNER's and/or project requirements.

3.2 For pipes 18 inches diameter and larger, install and use continuous temperature sensor strips. Provide the OWNER's representative with access to the longitudinal temperature monitoring system data during the installation via digital data, web-based or other approved methodology and printed reports.

3.3 CIPP INSTALLATION

A. CIPP liner shall be installed via inversion using hydrostatic head or air pressure in accordance with ASTM F 1216 or ASTM F 1743 and manufacturer's recommendations, or inserted through a manhole by means and methods required by the manufacturer. Hydrostatic head and/or steam pressure used during installation process shall be sufficient to hold liner tight to pipe wall; producing dimples at all service connections, and flared ends at two access manholes. Contractor shall closely follow the requirements in the submitted liner field curing reports, including the minimum inversion pressure, ideal head, maximum hot head and maximum cold head for each installation.

B. If CIPP does not fit tightly against original pipe at its termination points, at no additional cost to OWNER, the full circumference of CIPP exiting host pipe shall be filled with a resin mixture compatible with CIPP, approved by CIPP manufacturer and OWNER/Engineer. There shall be no significant leakage of groundwater between existing pipe and CIPP at manhole connection or service lateral connections. Any leakage shall be removed and/or eliminated by Contractor at no additional cost to OWNER. Any infiltration found at manhole and/or service connections shall be eliminated by Contractor at no additional cost to OWNER. Any infiltration runners or gushers as defined by NASSCO PACP shall be stopped with chemical hydrophilic grouting.

C. Contractor shall install a CIPPSL for areas where longitudinal shrinkage of the installed CIPP liner near the manholes is three (3) inches or more, at no cost to the OWNER/Engineer. For any other longitudinal shrinkage of the CIPP liner observed within a pipe segment, Contractor shall install a CIPPSL.

D. Fit heat source with monitors to accurately gauge temperature of incoming and outgoing water or steam supply. Place another such gauge between CIPP liner and pipe invert at downstream end to determine temperature during curing process. Temperature in CIPP during curing process shall be as recommended by resin manufacturer. Length of time for allowing curing process to be completed shall be of duration recommended by manufacturer, during which time Contractor shall maintain required temperature throughout CIPP. Provide a written temperature data chart/curing log to OWNER's Representative for review to ensure that curing temperatures for resin meet manufacturer's recommendations.

E. The full length from manhole to manhole of the installed resin-impregnated flexible felt tube CIPP liner shall be cured using circulating heated water or steam in accordance with ASTM F 1216 and manufacturer's recommendation. Resin shall be cured into a hard impermeable pipe with minimum specified thickness, providing a structurally sound, uniformly smooth interior and tight-fitting liner within existing pipe. Cool-down procedures shall be in accordance with ASTM F 1216 and manufacturer's recommendations. The cool-down shall follow manufacturer's guidelines, be measured digitally to allow inspector to inspect or record, be linear, and be gradual; no super cooled air shall be allowed to be injected.

F. Contractor may install CIPP lining in multiple sewer segments at one time where possible. When installing CIPP lining in multiple sewer segments at one time, the top one-half of CIPP liner in intermediate manhole shall be neatly removed, leaving the invert in place, and void between CIPP liner and existing channel shall be filled with non-shrink grout. Manhole bench shall be reconstructed as required to provide a smooth transition to new CIPP liner.

G. All cutting and sealing of CIPP liner at manhole connections shall provide watertight pipe and manhole seals. All cut edges of cured liner shall be thoroughly sealed with same resin as was

used in liner. Catalyst or hardener used shall be compatible with resin/catalyst used in liner previously, but shall not require an external heat source to begin exothermic reaction (curing). There shall be no leakage of groundwater into manhole between CIPP liner and existing sewer pipe and between existing sewer pipe and manhole wall.

H. Curing of resin system shall be as per recommendations of CIPP system manufacturer of CIPP product. Temperatures achieved and duration of holding the liner at those temperatures shall be per System Manufacturer's established procedures.

I. If cool-down is to be accomplished by introduction of cool water into an inversion standpipe to replace water being drained from a small hole made in downstream end, the hardened liner shall be cooled down to a temperature below 100 degree F, or ambient temperature, whichever is smaller, before relieving static head in inversion standpipe. Contractor shall take measures to ensure that, in release of static head, a vacuum will not be produced that could damage the newly installed CIPP liner.

J. Incorporate mitigation measures to control styrene odors during installation and curing of the liner. If any styrene odor complaints occur on the jobsite, the Contractor shall have means and methods to immediately mitigate the issue.

K. Vent and/or exhaust noxious fumes or odors generated during and remaining after curing process is completed. This process shall remain in place at all manholes, laterals, etc., until noxious odors have dissipated to an acceptable level in accordance with OSHA requirements for materials used and there is no more air pollution or potential health hazard left to general public or construction workers.

L. Water used for the purpose of pipe curing may be discharged downstream.

M. Provide piping, pumps, valves, and other equipment to discharge curing water.

N. After the installation of the first 1,000 linear feet of CIPP lining, no additional CIPP lining shall be installed until acceptance testing demonstrates that the product meets all thickness and strength properties specified herein. Once the Engineer has reviewed and approved the test results, the remainder of the lining installation may resume.

3.4 CONNECTIONS

A. After new CIPP has been cured and completely cooled down, if applicable, Contractor shall reconnect existing service laterals as designated by pre-installation television inspection report generated by Contractor. This shall be done without excavation but from interior of pipeline by means of a television camera and a remote cutting device that reestablishes service connection to not less than 95 percent or better of original diameter and to a maximum of 100 percent of original diameter; overcut connections are not acceptable. All openings shall be clean and neatly cut and the cut shall be buffed with a wire brush to remove rough edges and provide a smooth finish. Bottom of openings shall be flush with bottom of lateral pipe and shall have smooth edges with no protruding material capable of hindering flow or catching debris. All service lateral connections shall be sealed.

B. Coupons shall be removed from laterals by any means possible including entering homes to flush the material via access from cleanout. Coordinate access with OWNER and Engineer.

C. Excess resin that builds up and hardens in and around the lateral connections(s) must be removed and/or ground down prior to acceptance of the re-instatement. Contractor will be required to supply an extended lateral cutter bit to reach resin buildup beyond standard length bits.

D. Inactive service laterals will be abandoned by not reopening the service connection after installation of the cured-in-place pipe liner. If necessary, because of uncertainty of matching each tap in the sewer with each property, the Contractor shall dye test to verify if a service connection is active at the direction of the Engineer.

E. Service laterals that were determined to be inactive during CCTV inspection will be abandoned by not reopening service connection after installation of cured-in-place pipe liner. All lateral connections shall be identified as repaired or abandoned in post rehabilitation CCTV. Contractor to provide image file for all lateral locations along a given pipe segment. Contractor to provide image file at location of lateral even if lateral connection has been abandoned.

F. Contractor shall not open abandoned/capped service connections except at Engineer's direction. If an abandoned service connection is opened without OWNER/Engineer's approval, Contractor shall perform an internal spot repair to close connection, at no additional cost to the OWNER.

G. Contractor shall provide a fully operational backup device for reinstating service laterals. If there is any doubt about live vs. dead service based upon above property comparison with pipe connections, then Contractor shall verify with dye testing. If for any reason remote cutting device fails during reinstatement of a service lateral, Contractor shall immediately deploy standby device to complete reinstatement, at no additional expense to the OWNER. Backup equipment shall be onsite throughout reinstatement process. If the backup equipment is unable to reinstate the services laterals as described herein or to the OWNER's satisfaction, the Contractor (at no additional expense to the OWNER) shall excavate the lateral connection to restore service via the excavation methods described below.

H. For service lateral reconnections and/or renewals to be made by excavation methods, InsertaTees may be used for solid wall pipes having a 0.36-inch or greater wall thickness. InsertaTees shall be "Fatboy" type with hub manufactured of SDR 26 PVC material incorporating a 360-degree integral stop on the hub surface and exceeding ASTM F1336 Section 10.3 Pipe Stop Load Support Test, or approved equal. Romac type saddles shall be used for pipes having a wall thickness thinner than 0.36 inch. Saddle connections shall be seated and sealed to new CIPP using grout or resin compatible with the CIPP. Other services shall be renewed by trenchless lateral lining.

I. All existing break-in and/or hammer-tap (break-in) laterals shall be cut and sealed per to provide a watertight connection between the lateral and the lined pipe. Contractor shall submit a method for cutting and sealing of each lateral.

J. External reconnections are to be made with a tee fitting in accordance with CIPP System Manufacturer's recommendations. Saddle connections shall be seated and sealed to the new CIPP using grout or resin compatible with the CIPP.

3.5 CIPPSL HEAT CURED INSTALLATION

A. Clean each length of pipe to be lined and dispose of any resulting material as specified in Section 330130.41 “Cleaning of Sewers.”

B. All obstructions in the sewer which may impede the insertion of the liner shall be removed by the Contractor.

C. Conduct a television inspection of each length of pipe after it is cleaned as specified in Section 330130.16 “TV Inspection of Sewer Pipelines.” Document the location of all active service connections and verify the lengths of repairs as directed by the Engineer. A copy of these videotapes shall be submitted to the Engineer and provided to the OWNER.

D. Notify all property OWNERs who discharge sewage directly to the sewer being repaired that their service will be discontinued while the CIPPSL is being inserted, cured and active service connections reopened. Notify individual property OWNERs at least 48 hours in advance, giving the date, start time and estimated completion time for the work being conducted.

E. Furnish bypass pumping of sewage flows where the rehabilitation work is being performed. Bypass pumping shall be conducted in conformance with the requirements of Section 331210 “Temporary Bypass Pumping Systems.”

F. The CIPPSL material shall be measured, cut and impregnated with epoxy resin in the field to the measurements determined from the videotape inspections. The installation and curing of the CIPPSL’s shall be in complete accordance with the manufacturers' specifications and a representative of the manufacturer shall be present during the first day of installation.

G. The installed spot repair shall be cured by circulating hot water through the resin impregnated patch.

H. The inflatable element and hydrostatic pressure used during the installation process shall be sufficient to tightly hold the CIPPSL to the existing pipe wall, producing dimples at all service connections and squeezing surplus resin into any cracks in the pipe. This pressure shall be great enough to overcome or prevent infiltration from entering the existing pipeline during the curing process.

I. The Contractor shall ensure that the shroud covering the packer is completely removed from the repaired pipe.

J. Where CIPPSL’s connect to existing manholes, the repair shall create a watertight seal at the pipe connection and into the trough. All cut edges of the cured liner shall be thoroughly sealed with the same resin as was used in the CIPPSL materials.

K. Reopen all of the existing active service connections on each length of sewer following patching. The active service connections shall be reopened from inside the sewer by means of a cutting device controlled by a closed-circuit television camera. All cut out material shall be flushed out of the sewer.

L. Each active service connection shall be cut completely open and shall have smooth edges with no protruding material capable of hindering flow or catching and holding solids contained in the

flow stream.

M. Following installation of the spot repairs and reopening the active service connections, conduct a second videotape inspection of the completed work. This tape, along with the tape made in Paragraph 3.01B above shall become the property of the OWNER.

3.6 CIPPSL AMBIENT CURED INSTALLATION

A. The installation procedure shall conform to ASTM F2599-11

B. When required, the flow shall be by-passed. The pumping system will be sufficiently sized for normal to peak flow conditions. The upstream manhole is monitored at all times and an emergency deflate system will be incorporated so that the plugs may be removed at any time without requiring confined space entry.

C. Installer will clean and inspect the line using a pan/tilt camera capable of verifying active or inactive service connections and the overall structural condition of the pipeline. All roots, debris, and protruding service connections will be removed prior to reconstruction of the pipe segment.

D. The liner tube shall be frangibley attached to the inflation bladder at the leading end. A sufficient amount of approved catalyzed resin shall be introduced into the tube under a controlled vacuum. All resin shall be contained within the tube to ensure no public property or persons are exposed to the liquid resin. A resin-impregnated sample (wick), shall be retained by the installer.

E. The saturated tube along with the inflation bladder will be inserted into a flexible launcher device. The launching device shall be pulled into the pipe using a cable winch. The pull is complete when the end of the launching device is aligned with the beginning of the damaged pipe section. The resin and tube are to be completely protected during the pull. No resin shall be lost by contact with manhole walls or the pipe during the pull. The resin that provides a structural seal shall not contact the pipe until positioned at the point of repair. The resin should not be contaminated or diluted by exposure to dirt, debris, or water during the pull.

F. The installer shall be capable of viewing the entire liner contacting the host pipe from the beginning to the end of the liner verifying the liner has covered the entire damaged section. Video documentation of the entire liner contacting the host pipe, prior to curing shall be provided to the OWNER.

G. When the curing process is complete, the pressure shall be released. The inflation bladder and launching device shall be removed from the host pipe with the winch. Ensure that no barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, have been left in the host pipe. Any materials used in the installation other than the cured tube/resin composite must be removed from the pipe by installer.

H. Any service lateral connections covered by the sectional repair are to be opened using a self-propelled robotic cutting device specifically designed for cutting cured-in-place pipe.

3.7 CIPP FIELD TESTING AND ACCEPTANCE

A. Field acceptance of CIPP lining shall be based on OWNER's and Engineer's evaluation of installation, including a review of the CIPP liner curing data, review of post-rehabilitation CCTV inspection data, and review of certified test data for installed CIPP liner, including air testing. All CIPP sample testing, and repairs to installed CIPP as applicable, shall be completed before final acceptance, meeting requirements of these specifications and documented in written form.

B. For every 1,000 linear feet of CIPP liner installed for the first 5,000 linear feet, the Contractor shall perform sampling and testing to determine the installed CIPP liner flexural properties and CIPP liner thickness. After the first five (5) test results have been collected and all have passed the minimum standards per the specification, the OWNER may require collecting random samples up to one sample per 5,000 linear feet for testing. Frequency of testing may be reduced as approved by OWNER/Engineer after sufficient tests are performed to verify CIPP liner design, production and installation procedures. Likewise, frequency of testing may be increased by Engineer and performed by Contractor at no additional cost to OWNER when required tests show that installed CIPP liner does not meet specifications. If a test is not passed, Contractor shall re- evaluate liner thickness design to determine if installed physical properties meet minimum design requirements; if it does not, liner shall be replaced or relined with approval from Engineer at no additional cost to OWNER.

C. Testing shall be performed by an independent testing laboratory certified by the American Association for Laboratory Accreditation (A2LA). Contractor shall submit to Engineer the name and location of independent testing laboratory, a certified statement from laboratory indicating that they are independent from and not associated with Contractor in any way, and A2lA certification for independent testing laboratory.

D. All expenses for sampling and testing of installed liner shall be paid for by the Contractor. Cost of all manufacturer's testing to qualify products furnished to project site shall be the responsibility of Contractor.

E. Sampling and testing of the installed CIPP liner shall conform to ASTM F 1216 and the following requirements:

1. Remove one restrained sample of installed CIPP liner at least 18-inches in length. Sample shall be captured by installing CIPP liner through a section of PVC pipe (same diameter as existing sewer diameter) within the most downstream manhole of installation and at all intermediate manholes if multiple sewer segments are lined at same time. Contractor may elect to cut the sample longitudinally and provide 1/2 the sample to OWNER's representative or inspector for direct shipping to laboratory and keep other half of sample for additional testing if necessary.
2. CIPP liner thickness shall be measured in accordance with ASTM D 5813. Flexural properties shall be determined in accordance with ASTM D 790. Contractor shall label and date all samples and provide to inspector or OWNER's representative same day of installation for shipping to independent testing laboratory. Engineer shall be copied on all transmittals to independent testing laboratory. Testing results shall be submitted to Engineer or OWNER within 30 days after installation of CIPP liner or payment will be withheld.
3. After recalculations performed in accordance with Paragraph 3.6B above, any CIPP

lining that does not meet new calculated thickness requirements shall be corrected by Contractor in a manner approved by Engineer at no additional cost to OWNER. OWNER's decision on how to correct deficient CIPP liner installations shall be final. Options for correcting deficient CIPP liner installations that will be considered by OWNER include the following: removal of existing CIPP liner and re-lining the sewer, open-cut replacement of sewer from manhole to manhole, re-lining sewer with existing CIPP liner in place or accept the following penalties: For structural and thickness tests, if tests are within 90 percent of specification payment shall be 90 percent of the bid price per item. If the tests are between 75 percent and 89 percent, then 75 percent of the price shall be paid. If below 75 percent, Contractor shall reline the segment with a new liner that meets structural requirements.

F. Contractor shall perform a post-rehabilitation CCTV inspection of all sewers rehabilitated using CIPP lining methods in accordance with Section 330130.16 "TV Inspection of Sewer Pipelines." Post-rehabilitation CCTV inspection shall be performed following installation of CIPP liner and reinstatement of all active service laterals. The Contractor's project manager and/or superintendent shall review the post-rehabilitation inspection videos to confirm the quality of the videos and of the installed CIPP; only after the Contractor has confirmed that the video is of good quality, the videos shall be submitted to the OWNER. If it is determined that any repairs are needed at any segment, a new CCTV inspection shall be performed of the entire segment(s) after the repairs have been completed.

G. Liner Installation Inspection - A visual inspection of the liner will be considered acceptable if liner shows no significant, wrinkles, lifts, ridges, splits, cracks, delaminations, flats, dry spots, pinholes, shrinkage, foreign inclusions, crazing, reverse curvatures, or other type of defects in the CIPP lining. Significant defects shall be defined as those listed in sections above ; and/or any defect that may create a maintenance issue in future such as inhibiting CCTV cameras or allowing solids to get caught on defect, and/or any defect that appears to reduce long-term structural strength or stability of pipeline. Longitudinal wrinkles/fins in height up to a maximum of five percent of inside diameter of host pipe or 1-inch, whichever is smaller, may be acceptable and shall be evaluated by Engineer for acceptance on a case by case basis. Defective lining shall be repaired or replaced at no additional cost to OWNER. If during removal process, the pipe is damaged, Contractor shall perform a point repair at Contractor's own expense.

H. Post CCTV Video Inspection and Submittals: Contractor shall submit a digital CCTV of post-lined sewer within seven business days for each pipe segment. Engineer shall review and approve payment based upon satisfactory completion of a liner that is free of significant defects as defined in sections above.

1. Removal of wrinkles or fins deemed significant at the discretion of the OWNER, shall be removed using a milling head, relined or replaced by the Contractor as directed by the OWNER at no additional cost. There shall be no evidence of other major defects in the CIPP lining.
2. Longitudinal shrinkage of the CIPP liner's length, of more than three (3) inches from the face of the manhole shall be repaired with a fiberglass reinforced CIPP spot repair per above sections at no cost to the OWNER.

3. Circular shrinkage shall be measured by the Contractor via man entry to try to insert a 1/16" thick ruler or similar into any gap more than 8 inches past the MH wall. The Contractor shall document these measurements with digital photos that shall be submitted

to the OWNER/Engineer for approval. Circular shrinkage shall be repaired per manufacturer recommendations at no cost to the OWNER.

I. The CIPP liner shall be watertight. Groundwater infiltration through the wall of the liner shall be zero.

J. All service connections shall be opened to a minimum of 95 percent and a maximum of 100 percent of opening so that a new lateral or lateral lining can be installed properly. Any overcuts more than 105 percent shall be repaired with hydrophilic seal hat connection, CIPP liner or other approved method by Engineer.

K. All coupons and excess resin shall be removed from reinstated service laterals prior to acceptance of CIPP lining.

L. All pipe-to-manhole connections shall be watertight and free of infiltration.

M. When CIPP is installed using pressurized air, Contractor shall perform an air-test per Section 333100 “Sanitary Utility Sewerage Piping” in presence of OWNER’s representative immediately following cool down and prior to lateral reinstatement. Otherwise, hydrostatic testing (exfiltration test) of completed liner shall be performed after liner curing and cool down in accordance with ASTM F 1216. Hydrostatic testing shall be performed prior to reinstatement of active services.

N. Installed CIPP shall be tested for water tightness using an exfiltration test. Maximum allowable leakage shall be 50 gallons per day per diameter inch of pipe per mile in accordance with ASTM F 1216.

O. After all installations are complete, inspected, post-construction CCTV has been reviewed and approved by the OWNER/Engineer, and all work is satisfactory to OWNER/Engineer, contractor shall cut and trim the new liner at each manhole wall. Seal liner to manhole wall with a sealant material per sections above.

3.8 CIPPSL FIELD TESTING AND ACCEPTANCE

A. Field acceptance of all CIPPSL locations shall be based on the Engineer's evaluation of the installation and curing data along with review of the TV videotapes and manhole inspections.

B. Groundwater infiltration of CIPPSL shall be zero.

C. All active service connections shall be open and clear.

D. All active service connections shall be open and clear.

E. Defective CIPPSL’s shall be removed and replaced with new CIPPSL’s. If the replacement CIPPSL is not satisfactory to the Engineer, then remove the entire section of pipe being rehabilitated and replace it with new PVC pipe at no additional cost to the OWNER.

END OF SECTION 330130.72

SECTION 330130.80 - POINT REPAIRS TO SANITARY SEWER LINES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required to remove existing VC sewers and service laterals, install and test polyvinyl chloride (PVC) sewer pipe and fittings, complete as needed.

B. The work shall include cutting, removal and replacement of existing pavement and pavement base; temporary and permanent pavement; replacement of unsuitable backfill material; trench excavation with sheeting, shoring and bracing of the trench as necessary and/or as directed; exposing the sewer for inspection and repair; replacing defective pipe with new PVC pipe; tees; wyes and chimneys; compaction of all fill, backfill and subgrades; protection of existing pipelines, utilities, structures and work; dewatering, testing and all appurtenant work; maintaining existing sewer flows; and restoration of disturbed grass areas, sidewalks, and pavement.

C. Perform television inspection prior to construction to verify the existing conditions and the exact location of each point repair.

D. Pipe or piping refers to all pipe, fittings, material and appurtenances required to construct PVC sewer pipe complete, in place.

E. During point repair work, if existing sewer pipe is abandoned to facilitate the proper solution, no abandoned pipe shall be left in place, and must instead be removed and disposed of.

F. Related Sections
1. Section 310515 “Soils and Aggregates for Earthwork” for bedding materials.
2. Section 312333 “Trenching and Backfilling.”
3. Section 321216 “Asphalt Paving” for pavement repair and resurfacing.
4. Section 330130.16 “TV Inspection of Sewer Pipelines.”
5. Section 330130.41 “Cleaning of Sewers” for sewer cleaning.
6. Section 331210 “Temporary Bypass Pumping Systems” for maintenance of flow in existing sewers.
7. Section 333100 “Sanitary Utility Sewerage Piping” for sewer testing.

1.3 SUBMITTALS

A. Submit, in accordance with Section 013300 "Submittal Procedures", shop drawings, a list of materials, public notices, and technical data to the OWNER for approval prior to any work being performed under this Section of the Specifications.

B. Upon completion of the work, the Contractor shall submit, at a minimum, an 8 1/2" x 11" sketch indicating inverts, pipe alignments and connectivity to the existing system, pipe sizes and materials, manhole depths, and couplings (if necessary). No formal AutoCAD plans or survey is required.

C. Public Notifications: Provide 48 hour notice prior to the assessment of any pipe segment, distribute door-to-door a door hanger, approved by the OWNER and Engineer, describing the work to be performed to notify the OWNER of every property, including residences and businesses, that may be affected. Include necessary information on bypass pumping such as how long residents may be unable to utilize the sewer. Door hangers shall be double-sided with the notification information in the English language on one side and in the Spanish language on the reverse side. Affected properties shall include, but not be limed to, properties on which:
1. A sewer to be accessed is located.
2. A manhole for accessing a sewer to assessed is located.
3. An existing sewer easement that could be used to access the sewer is located.
4. A temporary right-of-entry agreement with the property OWNER and the contractor for accessing a sewer or manhole on the property.
5. An existing sewer lateral serving the property directly connects to a sewer to be assessed or manhole to be accessed for the sewer assessment.

1.4 QUALITY ASSURANCE

A. All PVC sewer pipe and fittings of a similar type shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM D3034, ASTM F1760 or ASTM F789 as applicable.

B. Inspections of the pipe may be made by the Engineer or other representatives of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.5 SYSTEM DECRIPTION

A. The equipment and materials specified herein are intended to be of standard types for use in transporting sewage.

B. Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

1.6 DESIGN CONDITIONS

A. Point repairs shall conform to the requirements of the Specification and requirements of the other associated work.

B. A Point Repair is considered the replacement of a minimum of two (2) linear feet section of piping with a maximum of 10 liner feet of total pipe installed. Reduce multiple joints while excavation is being performed. During any operation associated with point repair, the work may be modified as deemed necessary or as directed by the OWNER. The maximum total of 10 liner feet shall apply to any additional replacement required based on existing conditions at the time of construction or additional pipe required to connect to existing pipe in sound condition, as determined during construction.

C. On all sewer lines in which a point repair is to be made, the normal flow of sewage shall be rerouted with the OWNER's approval, by bypass pumping. Maintain sewage flow at all times.

D. The approximate location of point repairs will be identified with each on call project. The Contractor shall undertake such investigations, as he deems necessary, to verify the location of point repairs including television inspection on that line segment prior to excavation at no additional expense to the OWNER.

E. If the repair is for a service connection the pipe/service connection shall be replaced and the excavation backfilled in accordance with these Specifications. The Contractor shall be paid for such pipe replacement at the Contract unit prices bid for the point repair.

1.7 DELIVERY, STORAGE AND HANDLING

A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Engineer.

B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards and as specified herein.

C. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

D. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than that given in the following table:

Pipe Diameter (inches)	Max. No. of Rows Stacked
8 or less	5
12 to 21	4
24 to 30	3
33 to 48	2
54 and larger	1

E. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight or delivered to the site so that no pipe is exposed to sunlight for more than 60 days. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup or direct or indirect sunlight will not be permitted.

F. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the Contractor, at the Contractor's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing.

G. In handling the items, use special devices and methods as required to achieve the results specified herein. No uncushioned devices shall be used in handling the item.

PART 2 - PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. PVC solid wall gravity pipe and fittings shall be Type PSM, PVC SDR 35 with full diameter dimensions and shall conform to ASTM D3034 or ASTM F1760, for sizes 4 through 15-in. Straight pipe shall be furnished in lengths according to ASTM D3034 and wyes shall be furnished in lengths of not more than 3-ft. Saddle wyes will not be allowed.

B. PVC pipe and fittings shall have bell and spigot push-on joints. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly. Installation of elastomeric gasketed joints and performance of the joint shall conform to ASTM F477, ASTM D3139 or ASTM D3212.

C. Sewer pipe used for the point repairs shall be JM Eagle C900 BLUE BRUTE DR 14 pipe or approve equal.

2.2 COUPLINGS

A. Clamp style couplings to connect different pipe types shall be "Strong Back RC Series Repair Coupling," as manufactured by Fernco, Inc., or approved equal.

B. Flexible sleeve type couplings to connect different pipe types shall be of corrosion resistant rubber or PVC with Series 300 stainless steel clamp bands. Flexible sleeve type couplings shall

be as manufactured by Fernco, Mission Rubber Company, Inc., Calder, or equal. All stainless steel bands shall be coated with bitumastic.

C. Flexible donut type couplings to connect different pipe types shall be of corrosion resistant rubber or PVC. Flexible donut type couplings shall be as manufactured by Fernco or equal.

D. All couplings shall bear the manufacturer's identifying mark and size.

2.3 JOINTS

A. When connecting the new pipe to the straight spigot end of the existing pipe, suitable flexible adapters shall be used for joining dissimilar materials or similar materials. The adapters shall be either the insert type or the stainless steel banded coupling type (Fernco couplings, Pipe Conx by Uniseal, or approved equal) and approved by the OWNER. The adapter and band material shall be of materials, which pass the strength and chemical requirements of ASTM Designation: C594, latest revision. All banded maintenance couplings and adapters shall bear the manufacturer's identifying mark and size.

B. When connecting the new pipe to the bell end of existing sewer pipe a concrete encasement shall be used for joining dissimilar materials or similar materials. The concrete encasement shall cover the entire joint.

2.4 PIPE CONNECTIONS TO MANHOLES

A. Connect pipe to manhole in the following ways:

1. Grout in place - Precast manhole section shall have a formed, tapered circular opening larger than the pipe outside diameter. Grout shall be non-shrink and waterproof equal to Hallemite, Waterplug or Embeco. Plastic pipe shall have a waterstop gasket secured to pipe with a stainless-steel clamp.

2. Flexible sleeve - Integrally cast sleeve in precast manhole section or install sleeve in a formed or cored opening. Fasten pipe in sleeve with stainless steel clamp(s). Coat stainless steel clamp(s) with bituminous material to protect from corrosion. Flexible sleeve shall be Lock Joint Flexible Manhole Sleeve; Kor-N-Seal connector; PSX Press-Seal Gasket or equal.

3. Compression gasket - Integrally cast compression gasket in precast manhole section. Insert pipe into compression gasket. Compression gasket shall be A-Lok or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. The pipeline shall be excavated and exposed at the points of defects for the designated length of sewer section as recorded for inspection. All defective pipe located shall be uncovered so that the entire defect can be repaired or replaced and aligned into its final position in the profile.

This work shall be accomplished in such a manner that the integrity of the pipe and joints is not destroyed.

B. Upon completion of the realignment and rehabilitation of the defect as described herein, it shall be tested. It is the intention of these Specifications that all rehabilitated or repaired pipelines be tested.

C. Removal of fences, base material, storm drains, etc., that interfere with point repair at designated locations will be restored or replaced to their original condition prior to beginning a new operation, at no additional expense to the OWNER.

D. Replacement of and methods for bedding materials shall conform to the appropriate Sections of these Specifications.

E. Repair or replacement of existing defective sewer pipe shall conform to the appropriate Sections of these Specifications.

F. Repair or replacement of leaking service connections, wyes, tees and saddles shall conform to the appropriate Sections of these Specifications.

G. Connect all newly constructed sewer pipe to existing sewer pipe, main sewer line and service lines, all in good condition, so that no possible source of infiltration/ inflow (a leak in the line) may be created. Any sewer pipe damaged by the Contractor shall be replaced or repaired at his/her expense.

3.2 INSTALLATION OF PVC PIPE AND FITTINGS

A. No single piece of pipe shall be laid unless it is straight. 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-in per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the OWNER. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. PVC pipe and fittings shall be installed in accordance with requirements of the manufacturer, ASTM D2321 or as otherwise provided herein.

C. As soon as the excavation is complete to normal grade of the bottom of the trench, bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades required. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Bedding shall then be placed to 12-in above the top of the pipe. The initial 3-ft of backfill above the bedding shall be placed in 1-ft layers and carefully compacted. Generally, the compaction shall be done evenly on each side of the

pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3-ft of backfill shall be approved by the pipe manufacturer's representative prior to use.

D. All piping shall be sound and clean before installation. When installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer. Fittings shall be provided, if required, in crossing utilities which may be encountered upon opening the trench.

E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end.

F. The Engineer may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

G. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

H. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

I. Precautions shall be taken to prevent flotation of the pipe in the trench.

J. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. If trench boxes, moveable sheeting, shoring or plates have been installed below the top of the pipe, they shall be moved slowly taking care not to disturb pipe, bedding or backfill. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

3.3 JOINTING POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS

A. PVC sewer pipe and fittings shall be jointed in accordance with the recommendations of the latest ASTM Standards and detailed instructions of the manufacturer. The pipe manufacturer shall furnish information and supervise the installation of at least the first five joints.

B. All manhole connections shall conform to the appropriate section of these specifications except that concrete and mortared connections shall be equipped with an integral O-ring or other sealant such that a positive watertight seal is established.

C. Installation of all couplings shall be in accordance with manufacturer's instructions and as specified herein.

D. Any damage to existing pipe or fittings other than pipe or fittings specifically intended to be removed, replaced or abandoned as part of this Contract shall be repaired by the Contractor as directed by the Engineer. If the Contractor damages existing pipe or fittings through error or for his own convenience, he will be directed by the Engineer to repair all damages, in which case the repair work shall be performed at his own expense.

E. Flexible sleeve type couplings shall be installed over smooth spigot or cut ends of pipe. If cutting pipe is required, the cutting shall be done by machine or tool specifically intended for the purpose of cutting the type of pipe being worked on. All cutting of pipe shall be at right angles to the axis of the pipe and shall be performed so as to leave a smooth cut.

F. Replacement of existing sewer pipe using flexible couplings shall consist of removing the damaged pipe to the length. Care shall be exercised so that on the existing pipe left-in-place, a clean, unbroken spigot end (or smooth cut end) and a clean, unbroken bell end (or smooth cut end) are available to connect the replacement pipe to. The Contractor shall then insert a donut coupling into the bell end of the existing pipe and shall install the replacement pipe into the bell and donut. The replacement pipe shall have a sleeve coupling slide onto the opposite end and shall be "folded in" until it is aligned with the existing spigot end. The sleeve coupling shall then be slid halfway back over the existing spigot and clamped securely into place. The new pipe shall be bedded and backfilled as specified herein. The new pipe shall be accurately cut to length so that the gap left, after fold in, is 1-in or less. As an alternative, the Contractor may omit the donut coupling and use two sleeve type couplings to connect replacement pipe with plain or cut ends to two existing plain or cut end pipes.

3.4 INSTALLATION OF WYE AND TEE BRANCHES

A. All fittings shall be furnished by the same manufacturer that furnishes the pipe.

B. Wye or tee branches shall be furnished and installed in locations directed by the Engineer. Clamp style couplings shall be used to connect to the mainline pipe and service lateral as shown on the detail sheet.

C. Ample time shall be given to the Engineer to obtain the exact location of each wye or tee branches before it is covered. Wye or tee branches, which are covered before the Engineer has had time to obtain their location, shall be exposed so that location measurements can be taken.

D. Flexible sleeve type couplings shall be installed over smooth spigot or cut ends of pipe. If cutting pipe is required, the cutting shall be done by machine or tool specifically intended for the purpose of cutting the type of pipe being worked on. All cutting of pipe shall be at right angles to the axis of the pipe and shall be performed so as to leave a smooth cut.

E. Pipe stubs for manhole connections shall not exceed 3.25-ft in length unless directed otherwise by the Engineer. Install caps where required.

F. All service connections requiring replacement shall be replaced with wye branches or tees and connected to the mainline pipe and existing service with clamp style couplings as specified.

3.5 TESTING (GRAVITY PIPELINES)

A. Allowable Deflection Test

1. Pipe deflection measured not less than 90 days after the backfill has been completed as specified shall not exceed 5 percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.
2. Deflection shall be measured with a rigid mandrel (Go/No Go) device cylindrical in shape and constructed with a minimum of nine evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the Engineer for each diameter of pipe to be tested. The mandrel shall be hand pulled through all sewer lines.
3. Any section of sewer not passing the mandrel shall be uncovered at no additional cost to the OWNER and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested at no additional cost to the OWNER. Retested pipe shall not deflect more than 4 percent.
4. Following installation of the pipe and service connection, Contractor shall conduct a final videotaped color television inspection of the completed work. Copies of these tapes and the videotapes made prior to the installation shall be submitted to the Engineer for approval and shall be retained by the OWNER. Submit digital video on CD or DVD as well as a portable hard drive device a minimum of 10 days in advance of any payment request to provide the Engineer ample time to review the tapes. There shall be no splits, cracks, open joints or other type defects in the new pipe. Defective pipe will be removed and replaced at no additional cost to the OWNER.

END OF SECTION 330130.80

SECTION 330513 - MANHOLES AND STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Monolithic concrete manholes with masonry transition to cover frame, covers, anchorage, and accessories.
2. Modular precast concrete manhole and structures with tongue-and-groove joints with masonry transition to cover frame, covers, anchorage, and accessories.
3. Bedding and cover materials.

B. Related Requirements:

1. Section 033000 “Cast-in-Place Concrete” for manhole base pad construction.
2. Section 310515 “Soils and Aggregates for Earthwork” for soil for backfill in trenches.
3. Section 312333 “Trenching and Backfilling” for excavating for manholes and structures.

1.3 ACTION SUBMITTALS

A. Section 013300 “Submittal Procedures” for submittals requirements.

B. Product Data: Submit cover and frame construction, features, configuration, dimensions.

C. Shop Drawings

1. Submit shop drawings showing details of construction, reinforcing, joints, pipe connection to manhole, manhole rungs, and manhole frames and covers.
2. Submit for review, structural calculations and drawings for all precast structures. Structural design calculations and Drawings shall be prepared and stamped by a professional engineer registered in the State of Rhode Island.
3. Concrete design mix data and concrete test cylinder reports from an approved concrete testing laboratory certifying that the concrete used in the precast structures conforms with the strength requirements specified herein.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate: Products meet or exceed specified requirements.

B. Manufacturer Instructions: Detailed instructions on installation requirements, including storage and handling procedures.

C. Field Quality-Control Submittals: Results of Contractor-furnished tests and inspections.

D. Qualifications Statements: Qualifications for manufacturer.

E. Submit results of leakage tests.

1.5 QUALITY ASSURANCE

A. Perform Work according to City of Providence Department of Public Work's standard details and RIDOT Bluebook standards.

B. Maintain a copy of each standard affecting Work of this Section on Site.

C. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representative of the OWNER. Such inspection may be made at the place of manufacture, at work site, or at both places. Rejected materials shall be replaced at no cost to the OWNER.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Materials should not be stored on site without written request from OWNER.

B. Precast concrete sections shall be properly cured prior to loading and shipping. Precast concrete sections shall not be shipped before concrete has attained 3,000 psi compressive strength.

C. Unload, store, and handle precast manholes and structures according to manufacturer instructions.

D. Storage: Store precast concrete manholes and structures as to prevent damage to OWNER's property or other public or private property. Nothing should be stored on private property without written permission from an OWNER.

1. Repair property damaged from materials storage.

1.8 AMBIENT CONDITIONS

A. Materials should not be stored on site if not being used in a timely fashion. Contractor should find a storage facility for items not being used promptly

B. Subsequent Conditions: Maintain materials and surrounding air temperature at minimum 50 degrees F prior to, during, and 48 hours after completion of masonry Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

A. Equivalent strength: Based on structural design of reinforced concrete as outlined in ACI 318 and ACI 350.

B. Cement: ASTM C150, Type II or equal.

C. Load Rating: HS-20 live load plus the weight of the soil above at 120 pcf.

D. Reinforcement: The calculated stress in reinforcement closest to a surface in tension at service loads shall not exceed the value in Article 10.6.4.2 of ACI 350-06 and shall not be greater than 50 percent of the specified yield strength fy, for the manholes.

E. Floatation: Prevent floatation, with ground water level at finished ground surface, by dead weight of manhole or catch basin and soil load above manhole or catch basin. Do not consider skin friction, soil friction, or weight of equipment or contents in manhole and catch basin. Floatation safety factor shall not be less than 1.15. If required, provide reinforced concrete “hold-down” slab firmly anchored to the base of the manhole or catch basin with Type 316 stainless steel bolts.

F. Design of Lifting Devices for Precast Components: According to ASTM C913.

G. Design of Joints for Precast Components:

1. According to ASTM C913.
2. Maximum Leakage: 0.025 gal. per hour per foot of joint at 3 feet of head.

H. Shaft Construction: Concentric with concentric cone top section; lipped male/female joints; sleeved to receive pipe sections.

I. Shape: Cylindrical or Rectangular; as indicated on City of Providence Department of Public Work’s standard details.

J. Clear Inside Dimensions: As indicated on City of Providence Department of Public Work’s standard details.

K. Design Depth: As indicated on City of Providence Department of Public Work’s standard details.

L. Clear Cover Opening: 24 inches diameter.

M. Pipe Entry: Furnish openings as indicated on City of Providence Department of Public Work’s standard details.

N. Dampproofing: Outer surfaces of precast and cast in place manholes shall be given two coats of bituminous dampproofing at the rate of 30 to 60 sq ft per gallon as directed by the Engineer and in accordance with manufacturer's instructions. Damp proofing shall be Hydrocide 648 by Sonneborn Building Products; Dehydratine 4 by A.C. Horn Inc; RIW Marine Liquid by Toch Brothers or equal.

O. Top sections shall be eccentric except that barrel sections with flat slab shall be used where shallow pipe cover requires a top section less than 4-ft. Top sections shall accommodate male/female precast concrete grade rings.

2.2 MANHOLES

A. Manufacturers:

1. Substitutions: Section 016000 “Product Requirements.”

B. Manhole and Structure Sections: Reinforced precast concrete according to ASTM C478.

1. Gaskets: According to ASTM C923.

C. Precast Concrete Grade Rings: Reinforced precast concrete according to ASTM C478.

1. Lipped male/female joints
2. Gaskets: According to ASTM C923.
3. Grade rings shall withstand a live load of AASHTO HS20.

D. Clay Brick Units: ASTM C62, Grade SW solid units.

1. The bricks shall be good, sound, hard and uniformly burned, regular and uniform in shape and size, of compact texture and satisfactory to the Engineer. Underburned or salmon brick will not be acceptable and only whole brick shall be used unless otherwise permitted. In case bricks are rejected by the Engineer, they shall be immediately removed from the site of the work and satisfactory bricks substituted therefor.

    a. Bricks for the channels and shelves shall comply with ASTM C32 for Sewer Brick, Grade SS (from clay or shale) except that the mean of five tests for absorption shall not exceed 8 percent and no individual brick exceed 11 percent.
    b. Bricks for building up and leveling manhole frames shall conform to ASTM C62

E. Mortar and Grout:

1. Type S.
2. Mortar used in the brickwork shall be composed of one part Type II Portland cement conforming to ASTM C150 to two parts sand to which a small amount of hydrated lime not to exceed 10 lbs to each bag of cement shall be added

2.3 FRAMES AND COVERS

A. Manufacturers:

1. Manhole frame and covers shall be East Jordan Iron Works; Mechanics Iron Foundry; Neenah Foundry or equal. The following model numbers refer to East Jordan Iron Works products:

    a. Manhole Frame and Cover in Streets – 24” Manhole Frame and Cover EJ Product No. 240834B01 as shown in City of Providence Department of Public Work’s standard details.
2. Construction: ASTM A48, Class 30B cast iron.
3. Surface: Machined flat bearing.
4. Lid: Removable
5. Cover: See City of Providence Department of Public Work’s standard details.
6. Live Load Rating: H-20 loading plus the weight of the soil above at 120 pcf.
7. Sealing gasket as directed by Engineer and indicated on City of Providence Department of Public Work’s standard details.

8. Contractor shall supply five (5) additional 240834B01 frames and covers at the start of the project to be delivered to the OWNER. Cost to be included in the Bid Price for manholes.
9. Contractor shall not install and lock manhole bolts. Contractor shall return bolts to the City of Providence Department of Public Works.

2.4 STRUCTURAL DESIGN CRITERIA

A. Structures:

1. Structural design calculations for structures are to be prepared and sealed by a licensed Professional Engineer in the State of Rhode Island. The sealed drawings and calculations will be submitted for approval prior to fabrication.

2. The calculated stress in reinforcement closest to a surface in tension at service loads shall not exceed the value given in Article 10.6.4.2 of ACI 350-06, and shall not be greater than 50 percent of the specified yield strength fy, for the valve vault.

3. The minimum concrete thickness of walls and slabs shall be 8-in, or as indicated on Drawings or scope of work. Minimum reinforcing shall be #5 at 12-in, each face, each way. Additional reinforcing shall be provided around all openings.

4. Cast base slab and walls together to form a monolithic base section.

5. Structure top slabs shall withstand a live load of AASHTO HS-20.

6. Structure walls shall withstand an equivalent lateral fluid pressure of 60 pcf above groundwater and 90 pcf below groundwater. Design groundwater elevation is at finished grade. Originate pressure diagram at finished ground surface. Structure walls shall be designed for an additional surcharge load from adjacent structures and approaching vehicles in accordance with AASHTO. The coefficient of earth pressure at rest, ko shall be 0.5. Coefficient of friction is 0.35. Gross allowable bearing pressure of 3.0 ton per sq. ft. (tsf).

7. Consider discontinuities in structure produced by openings and joints. Provide additional reinforcing around openings. Frame openings to carry full design loads to support walls.

8. Prevent flotation, with ground water level at finished ground surface, by dead weight of structure and soil load above structure. Do not consider skin friction, soil friction, or weight of equipment or contents in structure. Provide concrete slab if required to prevent flotation.

9. Submit slab design and details and provide anchorage of the structure to the slab. Safety factor for floatation is 1.15 when groundwater is at finished grade. If required provide reinforced concrete “hold-down” slab firmly anchored to the base of the structure to resist buoyant forces with Type 316 stainless steel anchor bolts. Buoyancy calculations and anchorage design calculations and details shall be prepared and stamped by a professional engineer registered in the State of Rhode Island.

10. Frost depth: all exterior foundation shall extend a min. of 4’-0” below finished grade.

11. Locate horizontal wall joints 18 in. minimum from horizontal centerline of wall openings.

12. Design structures with minimum number of joints. Maximum number of structure sections,

including top slab, shall be four sections.

13. Provide lifting hooks for top slab.

14. Locate access openings and pipe penetrations as required.

2.5 MATERIALS

A. Bedding and Cover:

1. Bedding: Fill, as specified in Section 310515 “Soils and Aggregates for Earthwork.”
2. Cover: Fill, as specified in Section 310515 “Soils and Aggregates for Earthwork.”
3. Soil Backfill from Above Pipe to Finish Grade:

    a. Soil, as specified in Section 310515 “Soils and Aggregates for Earthwork.”
    b. Subsoil: No rocks over 6 inches in diameter, frozen earth, or foreign matter.

2.6 FINISHES

A. Steel Galvanizing: ASTM A123 . Hot dip galvanized after fabrication.

2.7 ACCESSORIES

A. Manhole and Structure Steps:

1. Formed Steel-Reinforced Plastic rungs M.A. Industries Type PS2-PF-SL or equal.
2. Formed integral with manhole and structure sections.
3. Diameter: 3/4 inch.
4. Width: 14 inch.
5. Spacing: 16 inch o.c. vertically and no greater than 24 inches from finished grade, set into manhole and structure wall.

B. Internal Drop Bowl Connections

1. Reliner Inside Drop System Or Equal
2. As shown on the Drawings

C. Pipe Supports for drop connections:

1. Metal for pipe support brackets: Type 316 stainless steel, 11 gauge.
2. All anchor bolts required for pipe support shall be Type 316 stainless steel

D. Base Pad: Leveled top surface. Cast-in-place concrete of type as specified in Section 033000 “Cast-in-Place Concrete.”

E. Pipe Connections to Manholes.

1. Manhole pipe connections may be accomplished in the following ways:

    a. The "Lock Joint Flexible Manhole Sleeve" shall be cast in the precast manhole base. The stainless steel strap shall be protected from corrosion with bitumastic or asphaltic dampproofing materials.
    b. "A-Lok" shall be a rubber like gasket cast in the precast manhole base. The rubber

gasket shall be cast into a formed opening in the manhole.

c. "KOR-N-SEAL" joint shall be installed as recommended by the manufacturer. The stainless steel clamp shall be protected from corrosion with bitumastic or asphaltic dampproofing materials.

d. With written approval from the Engineer, a tapered hole filled with non-shrink waterproof grout, Hallemite; Waterplug; Embeco or equal, after the pipe is inserted is acceptable, providing the grout is placed carefully to completely fill around the pipe. If this method is used, place concrete encasement to assure a total 12-in of concrete including manhole thickness around the pipe stub. For PVC pipe, a waterstop gasket and stainless steel clamp shall be attached to the pipe prior to grouting.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017300 “Execution” for installation examination requirements.

B. Verify that items provided by other Sections of Work are properly sized and located.

C. Verify that built-in items are in proper location and ready for roughing into Work.

D. Verify correct size of manhole and structure excavation.

3.2 PREPARATION

A. Section 017300 “Execution” for installation preparation requirements.

B. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers to indicate its intended use.

C. Coordinate placement of inlet and outlet pipe or duct sleeves required by other Sections.

D. Do not install structures where Site conditions induce loads exceeding structural capacity of structures.

E. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage; remove and replace damaged units.

3.3 INSTALLATION

A. Excavation and Backfill:

1. Excavate manholes as specified in Section 312000 “Earthwork” in location and to indicated depth.
2. Provide clearance around sidewalls of structure for construction operations.
3. When groundwater is encountered, prevent accumulation of water in excavations; place manholes in dry trench.
4. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation as approved by Engineer.

B. Base Pad:

1. Place base pad.
2. Trowel top surface level.

C. Place manhole sections plumb and level, trim to correct elevations, and anchor to base pad.

D. Backfill excavations for manholes and structures as specified in Section 312333 “Trenching and Backfilling.”

E. Form and place manhole cylinder plumb and level and to correct dimensions and elevations.

F. Cut and fit for pipe.

G. Grout base of shaft sections to achieve slope to exit piping, trowel smooth, and contour to form continuous drainage channel.

H. Set cover frames and covers level without tipping and to correct elevations.

I. Coordinate with other Sections of Work to provide correct size, shape, and location.

J. Precast Concrete Manholes:

1. Lift precast components at lifting points designated by manufacturer.
2. When lowering manholes into excavations and joining pipe to units, take precautions to ensure that interior of pipeline and structure remains clean.
3. Set precast structures bearing firmly and fully on crushed stone bedding, compacted as specified in Section 312333 “Trenching and Backfilling” or on other support system as required.
4. Assemble multi-section structures by lowering each section into excavation; set level and firmly position base section before placing additional sections.
5. Remove foreign materials from joint surfaces and verify sealing materials are placed properly.
6. Maintain alignment between sections by using guide devices affixed to lower section.
7. Joint sealing materials may be installed on Site or at manufacturer's plant.
8. Verify that installed manholes meet required alignment and grade.
9. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.
10. Cut pipe flush with interior of structure.
11. For manholes with drop bowl connections, cut incoming pipe so that only 2-inch maximum protrudes into manhole

    a. For improved flow control, cut a "V" shaped notch at bottom edge of incoming pipe
    b. Center Drop Bowl directly under incoming pipe, allow approximately 1" clearance between pipe and bowl.
    c. Attach Drop Bowl to manhole wall with 3/8" diameter stainless steel bolts in lead expansion anchors.

12. Shape inverts through manhole.

3.4 LOCATING, RAISING, RESETTING, AND/OR REPLACING MANHOLE FRAME AND COVER ASSEMBLIES

A. Where noted on the Drawings, scope of work, or directed by the OWNER and/or Engineer, the

Contractor shall locate and uncover buried manhole frame and covers; remove existing manhole frame and covers; dispose of existing manhole frame and covers, if they are not being reused; and install new or reused manhole frame and covers as directed by the OWNER and/or Engineer. The Contractor shall repair any damage to the manhole chimney or corbelling caused by the removal of the existing manhole frame at no additional cost to the OWNER.

B. Existing frames and covers to be reused shall be thoroughly cleaned before re-installation.

C. When re-setting existing frames and covers, Contractor shall apply preformed flexible joint sealant Kent Seal No. 2 by Hamilton-Kent or Ram-Nek by K.T. Snyder Company or equal.

D. The Contractor shall install new or reused frames so that the tops of the covers are at the required grade. The Contractor shall use HDPE grade rings or precast concrete grade rings to set the manhole frame and cover to the finished grade. HDPE and precast concrete grade rings shall be set in a bed of butyl mastic sealant as per manufacturer's recommendations.

3.5 FIELD QUALITY CONTROL

A. Section 014000 "Quality Requirements" for inspecting and testing requirements**.**

B. Test concrete manhole and structure sections according to ASTM C497.

C. Test cast-in-place concrete as specified in Section 033000 "Cast-in-Place Concrete."

D. Vertical Adjustment of Existing Manholes:

1. If required, adjust top elevation of existing manholes to finished grades as directed by Engineer.
2. Reset existing frames, grates, and covers that were carefully removed and cleaned of mortar fragments to required elevation according to requirements specified for installation of castings.
3. When removal of existing concrete wall is required, remove concrete without damaging existing vertical reinforcing bars, clean concrete from vertical bars, and bend into new concrete top slab or splice to required vertical reinforcement.
4. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete as specified in Section 033000 "Cast-in-Place Concrete."

E. Leakage Tests:

1. Performed on every manhole with Engineer observing.
2. Preparation:

    a. Prior to placing the shelf and invert, and pointing the horizontal joints, fill all lifting holes within 6 feet of ground surface with approved non-shrinking mortar.
    b. Lower groundwater table as required.
    c. Plug all pipes and other openings into manhole.

3. Test:

    a. Fill water to top of cone section.
    b. Observe for visible water in the excavated area.
    c. If area around manhole is backfilled or the test is unsatisfactory, repeat the test allowing for suitable time for absorption of water in the excavated area.
    d. At the end of the absorption period, refill manhole and wait 8 hours.

e. Refill the cone at the end of 8 hours, measuring the amount required to refill.
f. Extrapolate to determine 24-rate of leakage. Leakage not exceed 1 gallon per vertical foot in a 24-hour period.
g. Engineer will perform visual inspection along with the Contractor.

4. Repair:

a. If leakage is less than 3 gallons per vertical foot per 24 hours, make approved repairs to the manhole and retest, if it is determined the leakage is due to defects in the joints or sections.
b. If leakage is 3 gallons or more, then replace the entire manhole, including all joints and sections at the Contractor's expense. Retest the new manhole as described above.

F. A vacuum test may be substituted for a leakage test as follows:

1. The filling and pointing of exterior joints are not required where the excavation has not been backfilled.
2. Inflate to affect a seal between the vacuum base and the top of the manhole.
3. Connect the vacuum pump to the outlet port with the valve open and a vacuum of 10" Hg (20" of Hg absolute) drawn.
4. Close the valve.
5. The following test criteria shall apply to 4-ft and 5-ft diameter manholes:
6. Allowable drops in pressure:

a. Manholes 0 – 10 ft. deep:

1) drop of 1" Hg over 2 minutes.

b. Manholes 10 -15 ft. deep:

1) Drop of 1" Hg over 2-1/2 minutes

c. Manholes 15 - 30 feet:

1) Drop of 1" Hg over 3 minutes

7. If the pressure drop exceeds the acceptable limits, make necessary repairs as approved by the Engineer, and:

a. Re-test the manhole.
b. If the manhole fails to meet the minimum requirements of the vacuum test retest using the leakage test.

8. Upon completion of a successful vacuum test, the interior and exterior joints shall be filled and pointed.

3.6 CLEANING

A. Clean all new manholes to be free of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION 330513

SECTION 330526

TRACER TAPE

PART 1 GENERAL

1.01 SCOPE

A. This section covers tracer tape and stub end locators, as called for on the Drawings, scope of work, or specified by the Owner/Engineer and herein.

1.02 SUBMITTALS

A. Shop drawings and/or brochures shall be submitted for all items furnished in accordance with the provisions of the General Conditions.

B. Submittals required under this section include, but are not limited to, shop drawings or manufacturer's literature for the following:

1. Materials, colors, and printing

2. Samples

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Tracer tape shall be Terra-tape and Terra-tape D by Reef Industries, Houston, TX; Markline and Detectatape by Allen Systems, Houston, TX; an equivalent tape by Industrial Tape and Supply Company, Atlanta, GA; or approved equal.

2.02 TRACER TAPE

A. Tracer tape shall be at least three (3) inches wide.

B. Tracer tape for non-ferrous pipe or conduit shall be constructed of a metallic core bonded to plastic layers. The metallic tracer tape shall be a minimum 5-mil thick and must be locatable at a depth of eighteen (18) inches with ordinary pipe locators.

C. Tracer tape for ferrous pipe or conduit shall consist of multiple bonded plastic layers. The non-metallic tracer tape shall elongate at least 500% before breaking.

D. The tape shall bear the wording: 'BURIED DRAIN LINE BELOW: (with "DRAIN" replaced by "WATER, "SEWER", "ELECTRICAL", "GAS", "TELEPHONE", OR "CHEMICAL" as appropriate), continuously repeated every thirty (30) inches to identify the pipe.

E. Tape colors shall be as follows, as recommended by the American Public Works Association (APWA):

Electric	Red
Gas & Oil	Yellow
Communications	Orange
Water	Blue
Sewer & Drain	Green
Chemical	Red (not APWA)

2.03 LATERAL/STUB END LOCATORS

A. The lateral/stub end locators shall be two (2) inch by four (4) inch weather-treated wood, twenty-four (24) inches in length wherever possible, placed vertically, no more than six (6) inches below the finished grade, at the capped end of each lateral and manhole stub or at locations specified on the Drawings, scope of work, or by the OWNER / Engineer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Tracer Tape:

1. Tracer tape shall be installed directly above the pipe or conduit it is to identify, approximately twelve (12) inches below the proposed ground surface.

2. The Contractor shall follow the manufacturer's recommendations for installation of the tape, as approved by the Engineer.

3. The Contractor shall replace tracer tape over existing utilities which is disturbed during the course of construction.

B. The lateral/stub end locators shall be installed directly over the plugged end of the side street stubs and laterals within two (2) feet of the final grade elevation.

END OF SECTION 330526

SECTION 331210 - TEMPORARY BYPASS PUMPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnishing materials, equipment, and labor required to bypass pump and/or divert wastewater flows from sewers selected for spot replacement and/or CIPP lining as necessary to complete each project or scope of work and as specified.

B. The design, installation and operation of temporary bypass pumping systems shall be the Contractor's responsibility. Provide the services of a professional bypass company who can demonstrate to the OWNER and Engineer that the company specializes in the design and operation of temporary bypass pumping systems. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

C. Maintain temporary bypass pumping systems so that they are completely functional throughout the required period of service.

D. Following the required period of service, remove temporary bypass pumping systems from site.

E. Provide all maintenance including manufacturer recommended preventive maintenance and on-call repair services. Provide repair services and/or replacement equipment 24 hours per day, seven days per week within 4 hours of being called.

1.3 ACTION SUBMITTALS

A. Submit, in accordance with Section 013300 “Submittal Procedures”, the following.

1. Evidence of the qualifications of the entity performing bypass operations specified in this Section
2. BYPASS PUMPING PLAN: Prior to starting any construction on site, submit detailed plans and descriptions outlining all provisions and precautions regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, capacities of equipment, materials and all other incidental items necessary and/or required to protect the facilities, including protection of the manholes from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents
3. Detailed plans and sections showing the proposed pumping system layout including dimensions and elevations. Plan shall include but not be limited to the following:

    a. Staging area and access requirements for all pumps.

b. Number, size, material, location and method of installation of suction piping.
c. Number, size, material, location and method of installation of discharge piping.
d. Sewer plugging method and types of plugs.
e. Safety enclosures/fencing for pumping equipment and piping, suction manholes and discharge manholes.
f. Standby power generator size, location (if required).
g. Method of protecting discharge manholes or existing structures from erosion, damage and overflow. Method for bulkheading downstream sewers to prevent flow from backing up into the work area.
h. Emergency response plan for cleaning up leakage from bypass piping or spills from pumping equipment including fuel, hydraulic oil or lubricants.
i. Details of driveway and street crossings, and if Contractor will temporarily bury piping or use Engineer approved road ramps.
j. Certification from a Professional Engineer that the pumping system has been designed to meet specification requirements and will perform as intended.
k. Safety measures regarding fueling of equipment shall be implemented during life of the project.
l. Method and procedures for removing bypass and restoring the area.
m. Pump size, capacity, number of units, diesel engine specifications, fuel tank capacity, fuel consumption requirements, and method of refueling.
n. Calculations of static lift, pipe size selection, friction losses, flow velocity and pump selection.
o. Pump curves showing pump operating range.
p. Proposed method of freeze protection.
q. Proposed method of noise control for each pump.
r. Temporary pipe supports, anchorage, cover material and other accessories as required to stabilize the piping system.
s. Installation schedule and maintenance schedule.
t. Vendor phone number and pager number for 24-hour service.
u. A minimum of five reference installations of projects with similar size in wastewater pumping applications. Include contact names and phone numbers.
v. List of recommended spare parts to be stored on-site for emergency maintenance.

4. Provide information on the vendor's service staff capabilities and replacement parts inventory to show that the vendor has sufficient resources to provide emergency service and replacement equipment and/or parts to the site within 4 hours of a service call.
5. A description of system operation and controls. Include a list of all alarm conditions and procedures for correcting problems including equipment replacement.
6. A plan of operations for inclement weather including snowstorms. The plan shall demonstrate the ability to maintain pumping system operations throughout inclement weather events.
7. Public Notifications: Provide 48 hour notice prior to the assessment of any pipe segment, distribute door-to-door a door hanger, approved by the OWNER and Engineer, describing the work to be performed to notify the OWNER of every property, including residences and businesses, that may be affected. Include necessary information on bypass pumping such as how long residents may be unable to utilize the sewer. Door hangers shall be double- sided with the notification information in the English language on one side and in the Spanish language on the reverse side. Affected properties shall include, but not be limed to, properties on which:
   a. A sewer to be accessed is located.
   b. A manhole for accessing a sewer to assessed is located.

c. An existing sewer easement that could be used to access the sewer is located.
d. A temporary right-of-entry agreement with the property OWNER and the contractor for accessing a sewer or manhole on the property.
e. An existing sewer lateral serving the property directly connects to a sewer to be assessed or manhole to be accessed for the sewer assessment.

1.4 QUALITY ASSURANCE

A. Employ the services of a vendor who can demonstrate five years of recent and continuous specialization in the design, installation, operation and removal of temporary bypass pumping systems in wastewater applications. The complete system shall be furnished from a single vendor who shall be capable of providing service staff, repair parts and replacement of any deficient system component within four hours of a service call, 24-hours per day, seven days per week.

B. Provide the services of the manufacturer's representative for physical checkout field testing and operation and maintenance instruction for a minimum of one person day per pumping system. See requirements in PART 3.

C. Provide the services of the manufacturer's representative or designated alternative, who shall be contactable 24-hours per day via telephone or pager and shall be available to be on site within four hours of being contacted at no additional cost to the OWNER.

D. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

E. The bypass system including all pumps, pipe, hose, valves and fittings shall be provided by one bypass entity.

F. All hydraulic calculations and drawings required by the submittals shall be provided by the bypass entity and stamped by a Professional Engineer registered in the State of Rhode Island.

G. Each temporary pumping, piping and diversion system shall be tested and placed in service before the CIPP installation work may begin.

1. Prior to the diversion of any flow via plug/stop-log/pumping to any other pipeline, the Contractor shall contact the Engineer 72-hours in advance and any adjacent property OWNERs 72-hours in advance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery, Storage and Handling of equipment shall be as specified in Section 016000 “Product Requirements.”

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Furnish pumping units and all accessories from a single vendor. Each temporary bypass pumping system shall be complete including pumps, drives, piping, piping headers, valves, flow meter, controls and appurtenances as required for a complete system.

B. The pumps, drives and controls shall be designed and built for 24-hour continuous service at any and all points within the required range of operation, without overheating, without cavitation, and without excessive vibration or strain. All parts shall be so designed and proportioned as to have the strength, stability and stiffness and be constructed to meet the specified requirements. Methods shall be provided for inspection, repairs, and adjustment.

C. All necessary foundation bolts, nuts, and washers shall be furnished.

D. Each piece of equipment shall be furnished with a nameplate (with embossed data) securely mounted to the body of the equipment. As a minimum, the nameplate for the pumps shall include the manufacturer's name and model number, serial number, rated flow capacity, head, speed and all other pertinent data. As a minimum, nameplates for drives shall include the manufacturer's name and model number, serial number, horsepower, speed, input voltage, amps, number of cycles and power and service factors.

E. Bypass pumping system pumps/generators shall be housed in sound attenuated enclosures with critically silenced mufflers. Limit noise to 69 dBA or lower at 30 feet.

F. All equipment shall be suitable for outdoor operation under adverse weather conditions. Provide protection from freezing as required to maintain system operation.

G. Pumping system control panels shall be NEMA 4 and include flow indication, a flow totalizer, indicator lamps showing which pumps are operating, selector switch for auto or manual start and stop for each pump and visual and audible alarms for indication of operation failure and alarm conditions.

2.2 PERFORMANCE REQUIREMENTS

A. Capacities and Characteristics:

1. Pumps shall be identical in every respect with all parts interchangeable.
2. Each pump shall be designed for the conditions of service. All pumps shall have a rising head capacity curve for stable pump operation from the minimum head operating point to the shut-off head.

a.	Service:	Temporary Bypass Pumping
b.	Number of pumps:	As required by the Application
c.	Liquid:	Raw Wastewater
d.	Design capacity total peak (gpm):	As required by the Application
e.	Type of drive	Diesel engine or Electric

3. The by-pass system shall be of sufficient capacity to handle existing flows plus additional flows that may occur during a rain event. As a minimum, the bypass system shall have a capacity equivalent to the flowing-full capacity of the largest sewer to be rehabilitated as part of this project. The bypass system shall be of sufficient capacity to handle these flows or the Contractor must stop work immediately during a rain event. The Contractor should make every effort to schedule work during dry weather conditions to avoid the need to bypass wet weather flows and be aware if the sewer being CIPP lined is part of the combined or separate system. If the sewer is part of the combined system the line shall not be CIPP lined if rain is forecasted.

Full Flow Pipe Capacity			
Pipe Size (in.)	Minimum Slope (ft/ft)	Manning's n (ft)	Full Pipe Flow (MGD)
8	0.0040	0.013	0.50
10	0.0028	0.013	0.75
12	0.0022	0.013	1.08
15	0.0015	0.013	1.92
18	0.0012	0.013	2.15
24	0.0008	0.013	4.14

4. Pumping System Components:

   a. All pumps shall be centrifugal, end suction, fully automatic self-priming units that do not require the use of foot-valves, vacuum pumps, diaphragm pumps, or isolation valves or float apparatus in the priming system.
   b. Pump seals shall be high pressure, mechanical self-adjusting type with solid carbide faces capable of withstanding suction pressures to 100 psi without the pump running. The mechanical seal shall be cooled and lubricated in an oil bath reservoir, requiring no maintenance or adjustment. The oil bath reservoir shall not come in contact with or leak into the pumped water. Each pump shall be capable of running dry, with no damage for extended periods of time. All pump seal metal parts shall be stainless steel. All elastomers shall be Viton.
   c. Each pump shall be driven by a diesel engine or electric motor. Diesel engine shall be water cooled. If the Contractor uses electric motor driven pumps, power costs are the responsibility of the Contractor.
   d. If using diesel driven pumps, each pump and diesel engine shall be skid mounted with integral fuel tank and skid lifting bracket.
   e. Provide automatic start/stop controls for the pumping system to automatically maintain system flow. Controls shall be contained in a local control panel with provision to manually operate each pump, provide indication of pump operation, and indicate the total flow being pumped.
   f. Provide all required suction and discharge pipe and fittings, discharge manifold pipe and fittings, shutoff valves, check valves, flow meter, pressure regulating valves, insulation, freeze protection, and all required accessories. All pipe and fittings shall be high density polyethylene pipe with fused joints. All joints must be 100 percent restrained. Suction piping shall be rated for 25-in Hg vacuum. Discharge piping, fittings, connections, valves, and other discharge piping accessories shall be rated for a minimum working pressure of 150 psi.

g. Pumps shall not be connected by a common suction manifold. The use of PVC or steel pipe with couplings will not be accepted. All pipe or hose will be rated for 25-inch Hg vacuum.

PART 3 - EXECUTION

3.1 PREPARATION

A. Wet Weather Preparedness/Emergency Plan: Develop plan prior to initiating bypass flow operations. Plan to include but not limited to:

1. Communications plan identifying key Contractor and OWNER personnel to be contacted in case of emergency.
2. Tracking of weather forecasts to identify potential rain events that could substantially increase flows. Contractor shall not setup bypass plugs and pumps if substantial rain events are anticipated for the duration of the bypass system being active.
3. Observations/reporting of sewer flow elevations.
4. Ongoing plan identifying actions to be taken if the bypass system must be taken offline.
5. Additional spare parts for pumps and backup equipment not on site available on short notice.
6. Identification of sewer lines that are receive sewage flow and stormwater flow in order to avoid lining combined pipes during upcoming rain events.

3.2 INSTALLATION

A. Installation shall be in accordance with the system supplier's recommendations and approved shop drawing submittals.

B. Install pumping units on a firm level surface.

C. Furnish the services of the pump system supplier's representative for a minimum of one day per temporary bypass system to assist equipment installation and physical checkout.

D. Plugging or blocking of sewer flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed, it is to be removed in a manner that permits sewer flow to slowly return to normal without surge, to prevent surcharging downstream. Plugging or bulkheading downstream sewers shall also be performed where necessary to prevent sewage flow from backing up into the work area.

E. Air vents / air release valves on the bypass piping shall be configured to prevent any wastewater discharge.

F. When working inside manholes or sewer lines, the Contractor shall comply with OSHA requirements, with the exception that a depth of 4-ft defines a confined space, in lieu of 5-ft, when working in the presence of sewer gases, combustible or oxygen-deficient atmosphere, and confined spaces.

G. Absorbent mats and booms shall be installed around the flow bypass pump locations.

H. Odor control mitigation measures shall be taken to prevent release of odors from the suction and discharge manhole and temporary flow diversion system. A minimum 2-inch thick plywood collar with foam rubber seal shall be placed around the suction hose(s) and discharge pipe(s) to prevent odors from escaping from the manholes.

I. Safety enclosures/fencing or barriers shall be provided at pumping equipment, suction and discharge manholes.

J. Bypass pumping piping shall be located off streets and sidewalks in gutters, at the back edges of sidewalks or on shoulders of the roads. When the bypass piping crosses streets and driveways, the pipe provided must have adequate strength to withstand traffic loading. Lay bypass piping in a shallow trench in roadway easements covered with temporary surfacing or place the bypass pipelines in bump ramps approved by the Engineer. Contractor shall ensure that the transition for bump ramps do not cause any damage to passing vehicles.

K. Provide lighting and barriers for pedestrian and vehicular safety.

3.3 FIELD QUALITY CONTROL

A. Provide field in accordance with the approved shop drawing submittal. Field tests shall demonstrate conformance with system requirements.

B. Test.

1. Perform leakage and pressure testing of the bypass pumping discharge piping before it is used for bypass sewerage pumping.

a. Pressure Test

1) Perform successful hydrostatic testing of temporary bypass piping system using clean water at a pressure equal to 1.2 times the highest expected system operating pressure for a minimum of 15 minutes while maintaining test pressure within 3.0 psi of required test pressure.
2) Engineer will witness hydrostatic tests.
3) Hydrostatic test criteria for acceptance: No leakage.

b. Leakage Test

1) The leakage test shall be conducted concurrently with the pressure test.
2) All exposed piping shall be examined during the test. If any leaks, defective material or joints are detected, they shall be repaired or replaced, and the test shall be repeated at no additional cost to the OWNER prior to renewing use for bypass sewerage pumping.
3) No leakage of any kind will be permitted.
4) At the completion of the test, the pressure shall be released at the furthermost point from the point of application.

2. The Contractor shall require that field testing be conducted by the pump system supplier's representative in the presence of the Engineer. Furnish the services of the pump system

supplier's representative for a minimum of one day per temporary bypass system to conduct required testing.

C. Remove and replace any system component that fails to perform in accordance with specified requirements.

D. Physically inspect bypass pumping systems on at least an hourly basis during operation to determine that the systems are working correctly.

E. All leakage from flow bypass piping shall be immediately reported to the onsite inspector and the City of Providence. Spills shall be eliminated and cleaned up at no additional cost to the OWNER.

3.4 SYSTEM OPERATION

A. Perform all required maintenance on the equipment to maintain the system integrity and capacity as specified.

B. Provide clean-up and disposal of contaminated material and reporting for all product spills.

C. Maintain flow around the work area to prevent surcharging of and damage to pipes, protect public and private property from damage and flooding, wetlands and other natural resources.

D. Coordinate location of bypass piping with OWNER, Engineer, City of Providence, property OWNERs and others, as required and in compliance with all permits and established agreements.

3.5 EQUIPMENT REMOVAL

A. At the completion of the period of service, disconnect all temporary piping and remove all system components from the site. Restore the work site to its original condition.

B. Flush out pump and all piping with potable water prior to disassembling system. Sewage and related debris shall not be released onto surface features.

C. Contractor shall get potable water from hydrant using a backflow preventer with meter.

END OF SECTION 331210

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SECTION 333100 - SANITARY SEWERAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sanitary sewerage gravity piping.
2. Pipe markers.
3. Bedding and cover materials.

B. Related Requirements:

1. Section 330130.80 “Point Repairs to Sanitary Sewer Lines.”
2. Section 331210 “Temporary Bypass Pumping Systems.”
3. Section 033000 “Cast-In-Place Concrete” for concrete type for manhole base pad construction.
4. Section 310515 “Soils and Aggregates for Earthwork” for soils and aggregate for backfill in trenches.
5. Section 312319 “Dewatering.”
6. Section 312333 “Trenching and Backfilling” for execution requirements for trenching required by this Section.
7. Section 3301310.16, “TV Inspection of Sewer Pipelines.”
8. Section 330130.41 “Cleaning of Sewers.”

1.3 DEFINITIONS

A. Bedding: Fill placed under, beside, and directly over pipe, prior to subsequent backfill operations.

1.4 COORDINATION

A. Section 013100 “Project Management and Coordination” for coordination requirements.

B. Coordinate Work of this Section with termination of sanitary sewer connection outside building, connection to municipal sewer utility service, and trenching.

C. Notify affected utility companies at least 72 hours prior to construction.

1.5 PREINSTALLATION MEETINGS

A. Section 013100 “Project Management and Coordination” for preinstallation meeting requirements.

B. Convene minimum one week prior to commencing Work of this Section.

1.6 ACTION SUBMITTALS

A. Section 013300, “Submittal Procedures” for submittals requirements.

B. Product Data: Submit manufacturer catalog cuts and other information indicating proposed materials to be used, accessories, details, and construction information.

C. Shop Drawings: Showing layout and details of pipe, reinforcement, joints, gaskets, special fittings and the name of the pipe manufacturer.

D. Permits: The Contractor shall obtain a sewer and road opening permit for any excavated repairs at the Department of Public Works. Permit fees will be waived. The Contractor shall submit 5 copies of roadway opening permit.

1.7 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate: Products meet or exceed specified requirements.

B. Manufacturer Instructions: Special procedures required to install specified products.

C. Prior to each shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM Standards specified herein.

D. Submit information on quality control testing including dimensional drawings of any mandrels or other ovality testing equipment.

E. Field Quality-Control Submittals: Results of Contractor-furnished tests and inspections.

F. Results of the compressive strength tests to the Engineer.

1.8 CLOSEOUT SUBMITTALS

A. Section 017700 “Closeout Procedures” for closeout procedures requirements.

B. Project Record Documents: Record locations of pipe runs, connections, cleanouts, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.9 QUALITY ASSURANCE

A. Perform Work according to RIDOT Bluebook standards.

1.10 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Section 016000, “Product Requirements” for transporting, handling, storing, and protecting products requirements. Refer to specific pipe material sections for additional information.

B. Inspection: Accept materials on Site in manufacturer’s original packaging and inspect for damage.

C. Storage: Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Block individual and stockpiled pipe lengths to prevent moving.
3. Provide additional protection according to manufacturer instructions.
4. Protect materials from weather and UV exposure.

1.12 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Field verify fit-up to existing infrastructure prior to fabrication.
3. Document field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 SANITARY SEWERAGE PIPING

A. Plastic Pipe: Polyvinyl chloride (PVC) per ASTM D3034, SDR-35.

1. Inside Nominal Diameter: varies, as indicated in the scope of work.
2. End Connections: Bell and spigot style, with rubber-ring-sealed gasket joint.
3. Fittings: PVC.

4. Joints: Elastomeric gaskets per ASTM F477.

2.2 MATERIALS

A. Bedding and Cover:

1. Bedding: Fill Type as specified in Section 310515 “Soils and Aggregates for Earthwork”
2. Cover: Fill Type as specified in Section 310515 “Soils and Aggregates for Earthwork”
3. Soil Backfill from Above Pipe to Finish Grade:

a. Soil Type as specified in Section 310515 “Soils and Aggregates for Earthwork.”
b. Subsoil with no rocks over 6 inches in diameter, frozen earth, or foreign matter.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017300 “Execution” for installation examination requirements.

B. Verify that trench cut is ready to receive Work.

C. Verify that excavations, dimensions, and elevations are as indicated on layout drawings.

3.2 PREPARATION

A. Section 017300 “Execution” for installation preparation requirements.

B. Correct over-excavation with coarse aggregate.

C. Remove large stones or other hard materials that could damage pipe or impede consistent backfilling or compaction.

D. Protect and support existing sewer lines, utilities, and appurtenances.

E. Utilities:

1. Maintain profiles of utilities.
2. Coordinate with other utilities to eliminate interference.
3. Notify Engineer if crossing conflicts occur.

3.3 INSTALLATION:

A. Install Work according to RIDOT Bluebook standards.

B. Bedding:

1. Excavate pipe trench as specified in Section 312333 “Trenching and Backfilling.”

2. Place bedding material at trench bottom.
3. Level materials in continuous layer not exceeding 6 inches or as indicated in the scope of work.
4. Maintain optimum moisture content of bedding material to attain required compaction density.

C. Piping:

1. Install pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.

2. Lay pipe to slope gradients as indicated on layout drawings.
3. Maximum Variation from Indicated Slope: 1/8 inch in 10 feet. Install pipe with a negative / downward oriented slope unless explicitly stated by Engineer.
4. Install bedding at sides and over top of pipe, to minimum compacted thickness of 12 inch.

5. Backfill and compact as specified in Section 312333 “Trenching and Backfilling.”
6. Do not displace or damage pipe when compacting.
7. Connect to existing sewer system through installed sleeves.
8. Pipe Markers: As required by OWNER.
9. Install Site sanitary sewage system piping to within 5 feet of building, and connect to building sanitary waste system.

3.4 FIELD QUALITY CONTROL

A. Section 014000 “Quality Requirements” for inspecting and testing requirements.

B. Request inspection by Engineer prior to placing bedding.

C. Testing: If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.

D. General

1. All sewers shall be tested for leakage by an infiltration test if the ground water level is a minimum of 2-ft above the crown of the pipe for the full length of the section tested.
2. When sewers cannot be tested by an infiltration test as specified above, they shall be tested by an exfiltration test using water or air.
3. Contractor will be required to perform television inspection of new pipeline for leaks and defects when requested by Engineer.
4. Test the first section of pipeline as soon as it is installed to demonstrate that the work conforms to this Section.
5. Testing of pipe shall closely follow pipe laying. No more than 1,000-ft of pipe shall remain untested at any time.
6. All testing specified herein as specified in Section 330130.80 “Point Repairs to Sanitary Sewer Lines” shall be completed within 120 days of pipe installation.

E. Testing of Gravity Sewer Piping:

1. Low Pressure Air Testing:

a. Test each reach of gravity sewer piping between manholes.
b. Introduce air pressure slowly to approximately 4 psig.

1) Determine ground water elevation above spring line of piping.
2) For every foot of ground water above spring line of piping, increase starting air test pressure by 0.43 psi.
3) Do not increase pressure above 10 psig.

c. Allow pressure to stabilize for at least five minutes.
d. Adjust pressure to 3.5 psig or to increased test pressure as determined above when ground water is present.
e. Testing: Determine test duration for reach of sewer with single pipe size from following table; do not make allowance for laterals.

NOMINAL PIPE SIZE, INCHES	MINIMUM TESTING TIME, MINUTES/100 FEET
3	0.2
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
33	5.4
36	6.0

1) Record drop in pressure during testing period.
2) Test Acceptance: If 1.0 psi air pressure drop has not occurred during testing period, piping is acceptable; discontinue testing.
3) Test Failure: If air pressure drops more than 1.0 psi during testing period pipe has failed.

a) If piping fails, test reach of piping in incremental stages until leaks are isolated, repair leaks, and retest entire reach between manholes.

2. Exfiltration Testing: Pipes Larger than 36 inches in diameter:

a. Maximum Allowable Exfiltration: 100 gal./inch of pipe diameter for each mile per day for each reach of piping undergoing testing.
b. Perform testing with minimum positive head of 2 feet.

3. Deflection Testing of Plastic Sewer Piping:

   a. Vertical Ring Deflection Testing: On PVC and acrylonitrile butadiene styrene sewer piping after backfilling has been in place for 30 days but not longer than 12 months.
   b. Allowable Maximum Deflection: For installed plastic sewer pipe; not greater than 5 percent of original vertical internal diameter.

   c. Deflection Testing: Using properly sized rigid ball or "go, no go" mandrel.

      1) Furnish rigid ball or mandrel with diameter not less than 95 percent of base or average inside diameter of pipe, as determined by ASTM standard to which pipe is manufactured.
      2) Measure pipe diameter in compliance with ASTM D2122.

   d. Perform testing without mechanical pulling devices.
   e. Locate, excavate, replace, and retest piping that exceeds allowable deflection.

4. Compaction Testing:

   a. Comply with ASTM D1557.

F. TV Inspection

1. Contractor shall conduct television inspection of new sewer in addition to other testing requirements to verify the proper construction of new sewer. Television inspection equipment and procedures will be as specified in Section 330130.16 “TV Inspection of Sewer Pipelines.”

3.5 PROTECTION

A. Section 017300 “Execution” for protecting finished Work requirements.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

3.6 CLEANING

A. At the conclusion of the work, thoroughly clean all pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material, which may have entered the pipes during the construction period. Debris cleaned from the lines shall be removed from the low end of the pipeline. If after this cleaning, obstructions remain, they shall be removed. After the pipelines are cleaned and if the groundwater level is above the pipe or following a heavy rain, the Engineer will examine the pipes for leaks. If any defective pipes or joints are discovered, they shall be repaired.

END OF SECTION 333100

SECTION 334000

REINFORCED CONCRETE PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE

A. This section of the specification covers the furnishing, handling, hauling, laying, jointing, and testing of all reinforced concrete pipe used for the drainage installations. This specification covers all fittings and appurtenant work as required.

1.02 QUALITY ASSURANCE

A. All pipe and fittings shall be inspected and tested as required by the standard specifications to which the material is manufactured. The Contractor shall furnish in duplicate to the Engineer sworn certificates of such tests.

B. In addition, the OWNER reserves the right to have any or all pipe, fittings and special casting inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the expense of the OWNER.

1.04 REFERENCES

A. The following standards form a part of this specification as referenced:

ASTM C 76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 144	Aggregate for Masonry Mortar
ASTM C 150	Portland Cement
ASTM C 443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
AASHTO M 198	Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

AASHTO STANDARDS REFERENCED

Number	Title
M 45	Aggregate for Masonry Mortar
M 85	Portland Cement
C 206	Finishing Hydrated Lime
F 405-77	

1.05 SUBMITTALS

A. Six (6) sets of all shop drawings shall be submitted to the Engineer for review.

B. Shop drawings shall consist of manufacturer's scale drawings, cuts or catalogs including descriptive literature and complete characteristics and specifications, and code requirements. Shop drawings shall be submitted for the reinforced concrete pipe, type of joint, fittings, couplings, filling rings, and lining and coating in accordance with specifications.

PART 2 PRODUCTS

2.01 PIPE

A. Pipe shall be Reinforced Concrete Pipe, Class IV, in accordance with the requirements of ASTM C 76 and ASTM C 507.

B. Concrete pipe may be either bell and spigot or tongue and groove. The method of joining pipe sections shall be such that the ends are fully entered, and the inner surfaces are reasonably flush and even.

C. Concrete for pipe cradles shall have a minimum compressive strength of 4,000 psi at 28 days.

D. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C 443.

E. The mortar for brick masonry and similar work shall be composed of one part of Portland cement and 2 parts of mortar sand, by volume the Portland cement shall conform to the requirements of ASTM C 150, Type I. The sand shall conform to the requirements of ASTM C 144.

F. Poured filler for joints shall conform to the requirements of ASTM D 1190.

G. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

2.02 JOINING PIPE

Joints shall be made with (1) Portland cement mortar, or (2) rubber gaskets. Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Rubber ring gaskets shall be installed to form a flexible watertight seal.

END OF SECTION 334000

APPENDIX D:

STANDARD DETAILS

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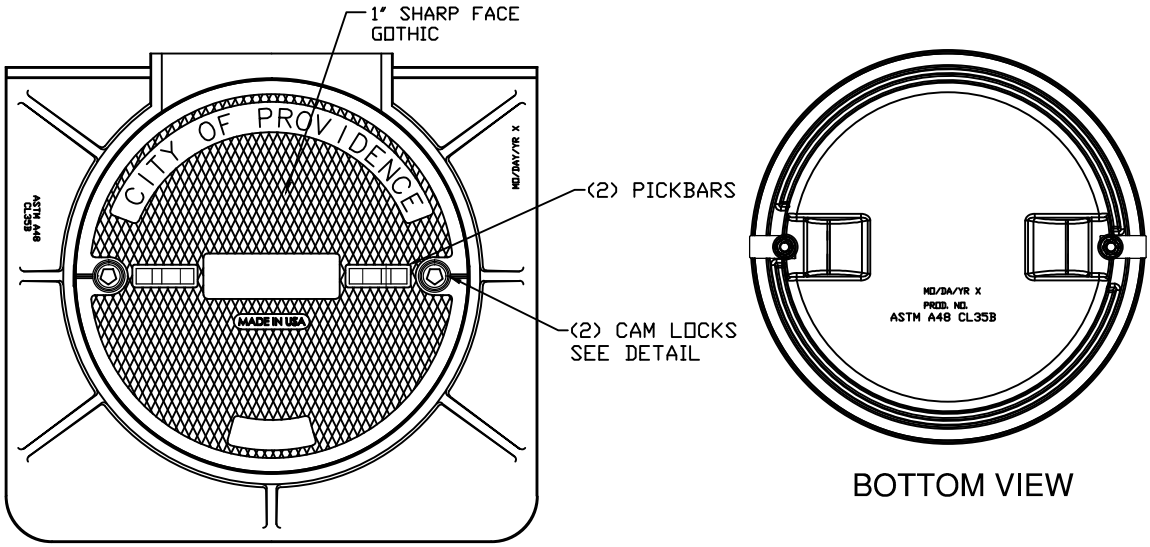
CITY OF PROVIDENCE - STANDARD DETAILS

INDEX

43.3.1	1/6/17	Wheelchair Ramp for Limited Right-of-Way Areas (RIDOT Standard)
43.3.2	1/6/17	Ramp-Landing for Narrow Sidewalk (RIDOT Standard)
48.1.0	1/6/17	Detectable Warning Panel Placement (RIDOT Standard)
43.5.0 P	rev. 10/6/17	Cement Concrete Driveways
60.1.0 P	1/6/17	Temporary Roadway Restoration
60.2.1 P	1/6/17	Permanent Roadway Restoration – Granular Base
60.2.2 P	1/6/17	Permanent Roadway Restoration – Concrete Base
60.2.3 P	8/8/17	Cobblestone Restoration – Granular Base
60.4.0 P	1/6/17	Inlet/Apron Stone Reveal

Details appearing in this document have been adopted as City of Providence Standard. Refer to Rhode Island Department of Transportation (RIDOT) for all other standard details:

http://www.dot.ri.gov/documents/doingbusiness/RIDOT_Std_Details.pdf



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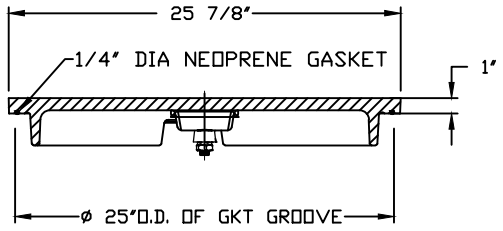

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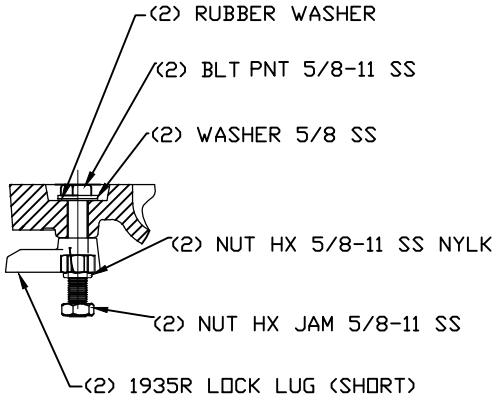
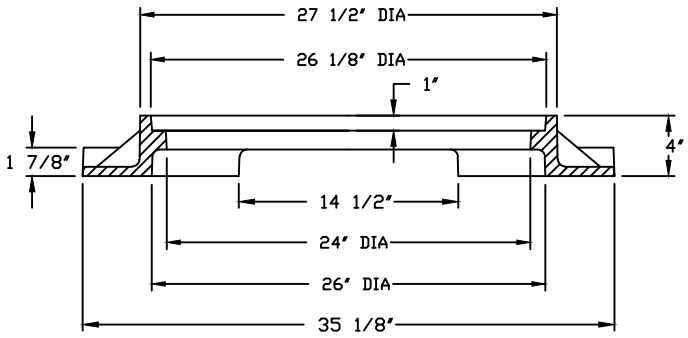


LOCK LUG ASSEMBLY



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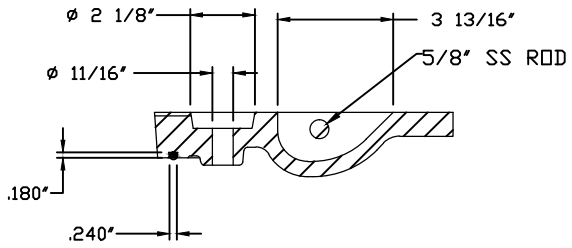


PICKBAR & LOCKLUG HOLE DETAIL

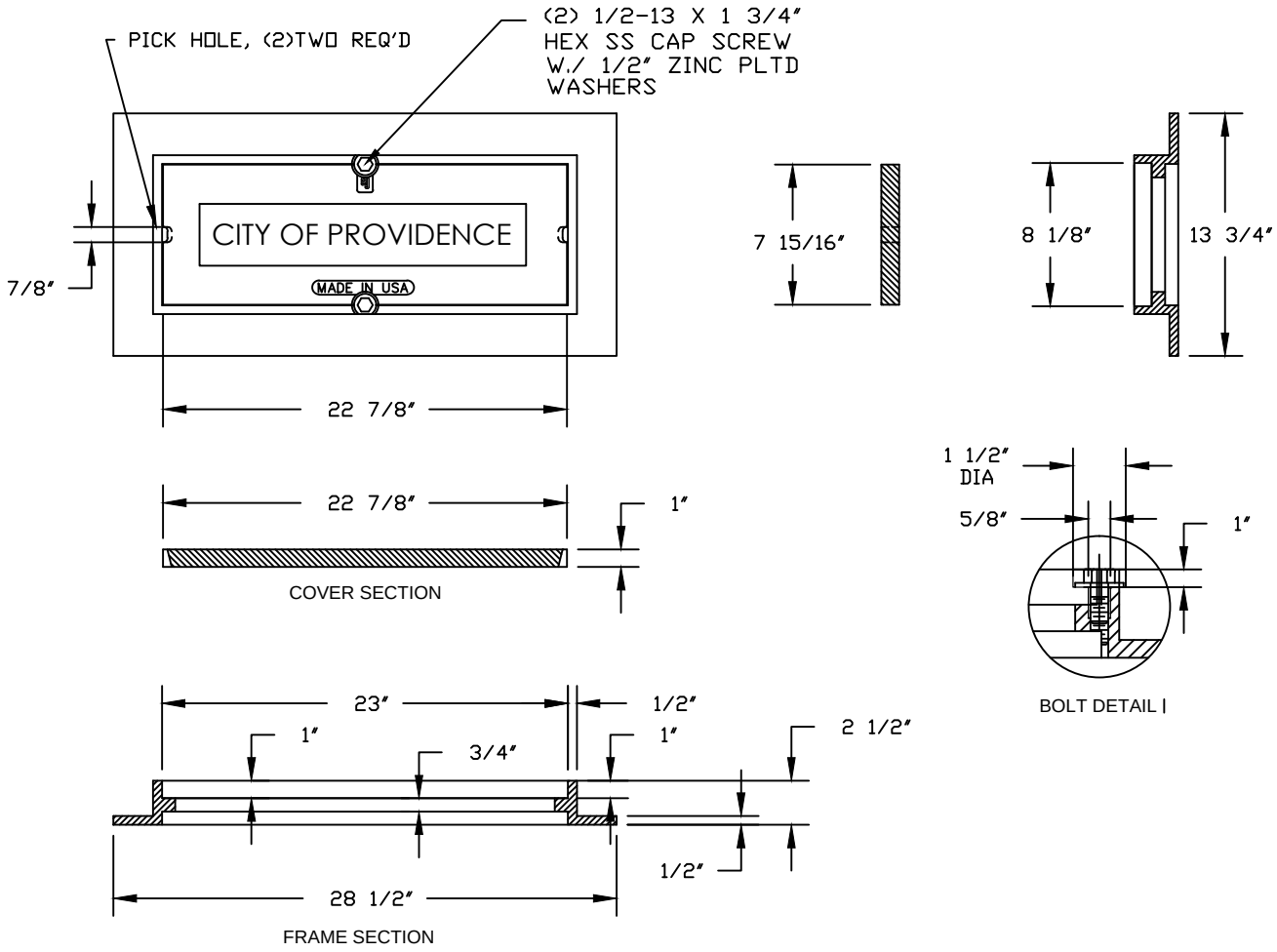
NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. ALL MATERIALS SHALL BE GRAY IRON AND SHALL BE ASTM A48 CERTIFIED.
3. SHALL BE EJ PRODUCT 1040081A02 OR APPROVED EQUAL.

SIDEWALK MANHOLE FRAME AND COVER

6.1.1.P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



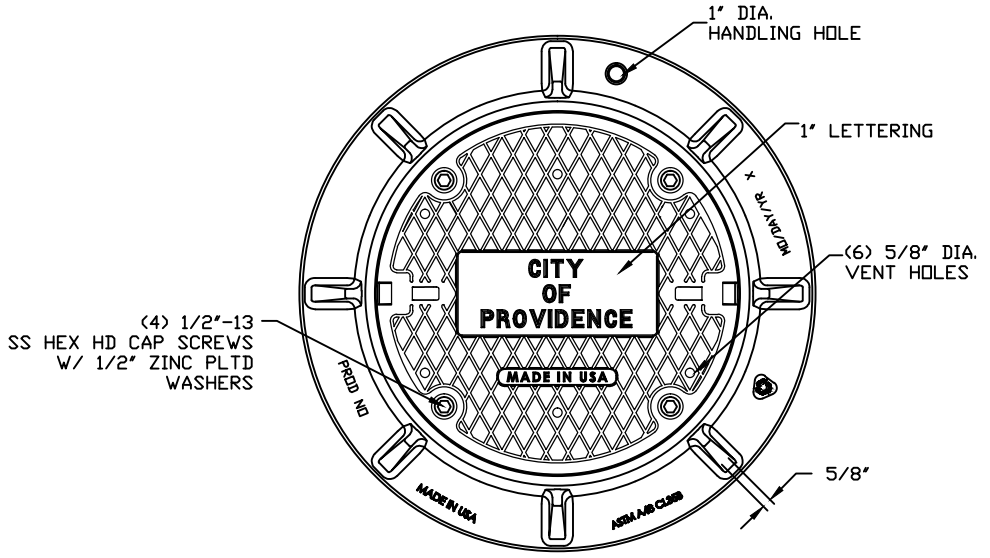
Notes:

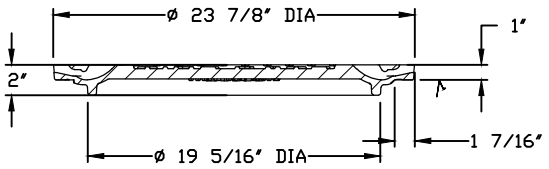
1. Materials shall conform to Section M.04 of the Rhode Island Standard Specifications.
2. All materials shall be gray iron and shall be ASTM A48 certified.
3. Shall be EJ Product 801144B01 or approved equal.

CHUTE FRAME AND COVER

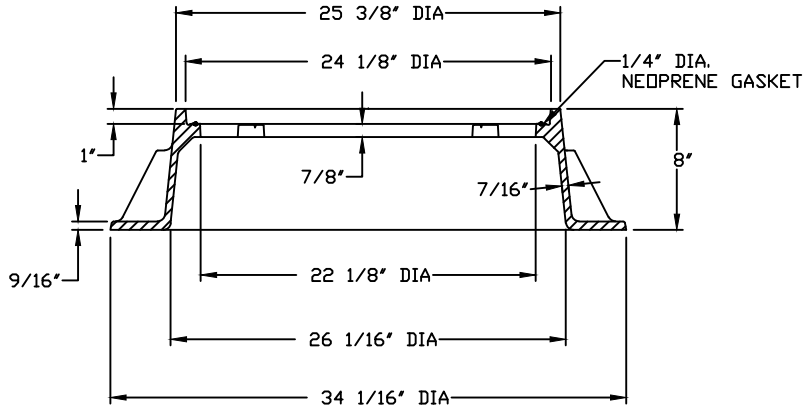
6.1.2 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17





COVER SECTION



FRAME SECTION

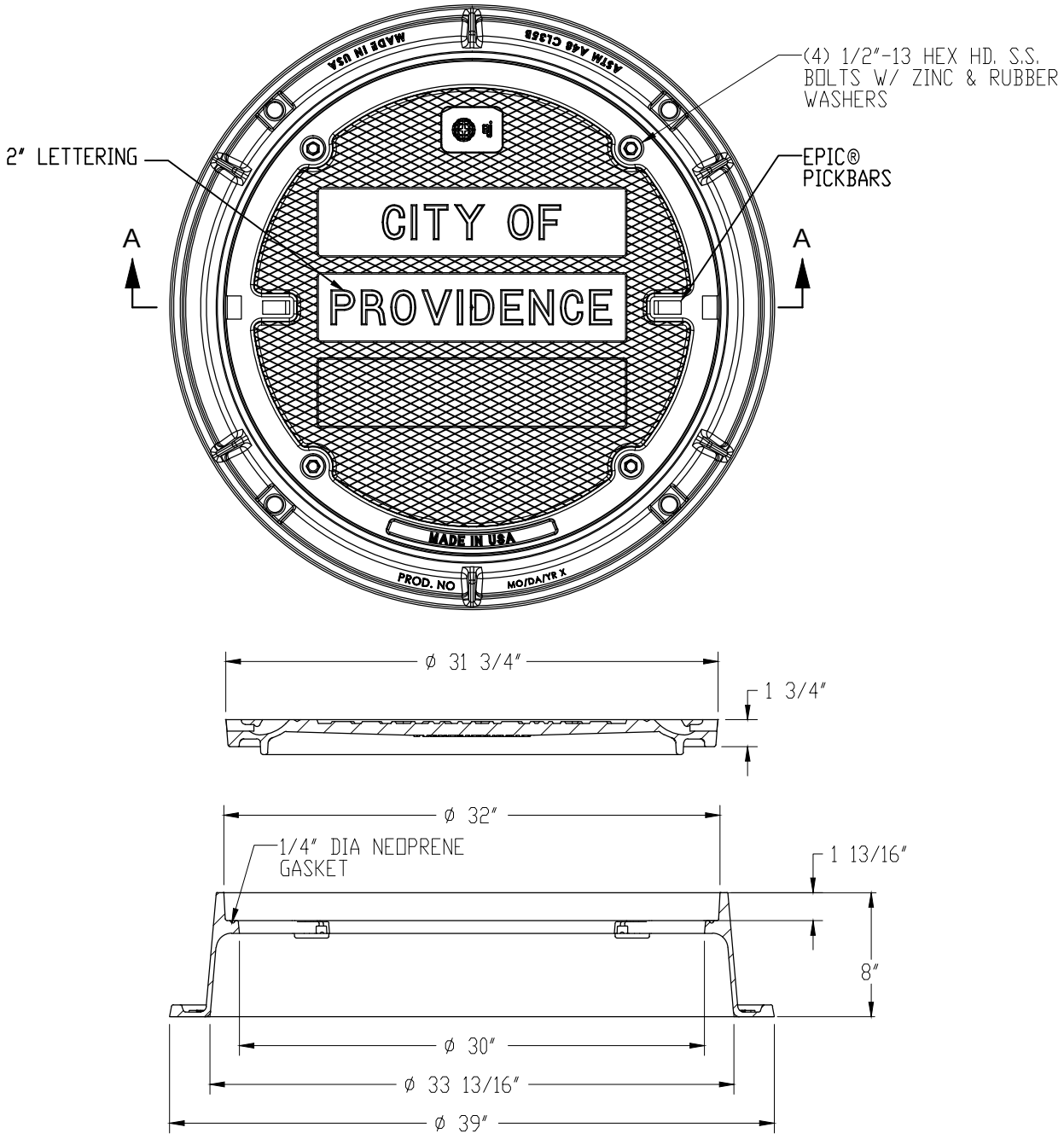
NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. THE MATERIALS SHALL BE GRAY IRON AND SHALL BE ASTM A48 CERTIFIED.
3. SHALL BE EJ PRODUCT 240834B01 OR APPROVED EQUAL.

HEAVY DUTY MANHOLE FRAME AND COVER-24 INCH

6.2.1 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



SECTION A-A

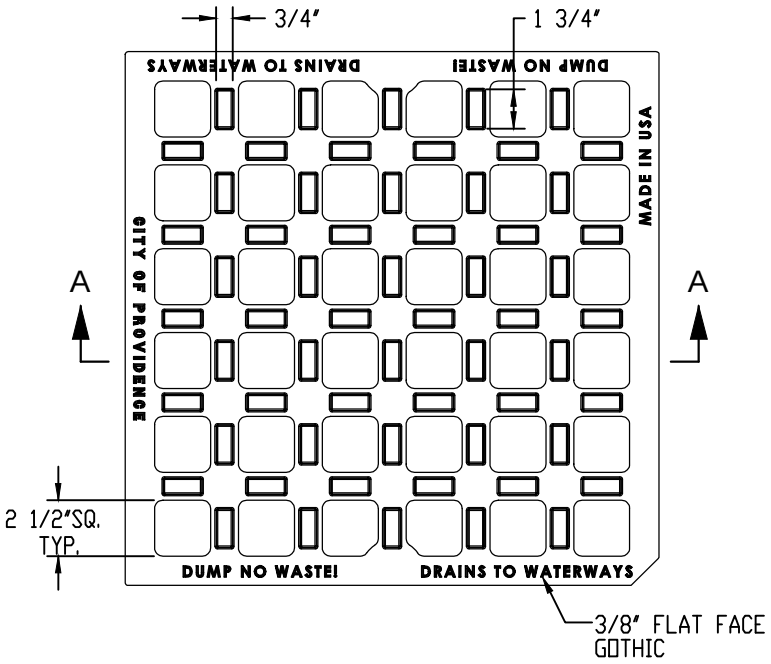
Notes:

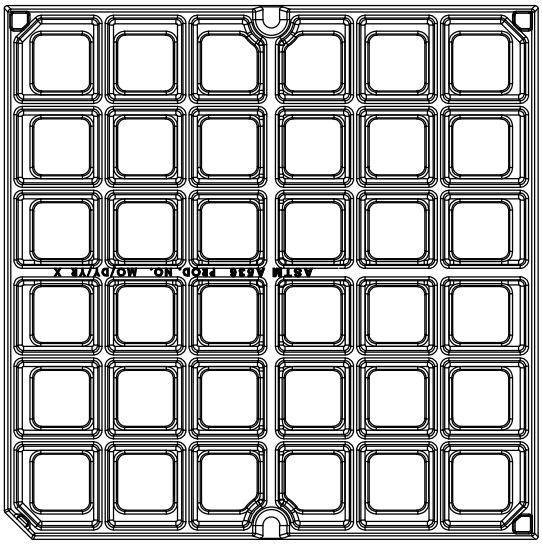
1. Materials shall conform to Section M.04 of the Rhode Island Standard Specifications.
2. All materials shall be gray iron and shall be ASTM A48 certified.
3. Shall be EJ Product 200694W03 or approved equal.

HEAVY DUTY MANHOLE FRAME AND COVER-32 INCH

6.2.2 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17





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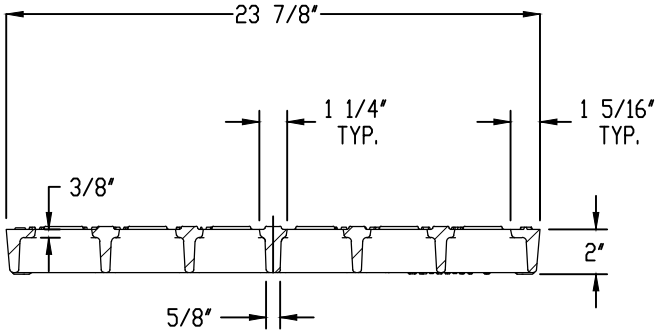


SECTION A-A

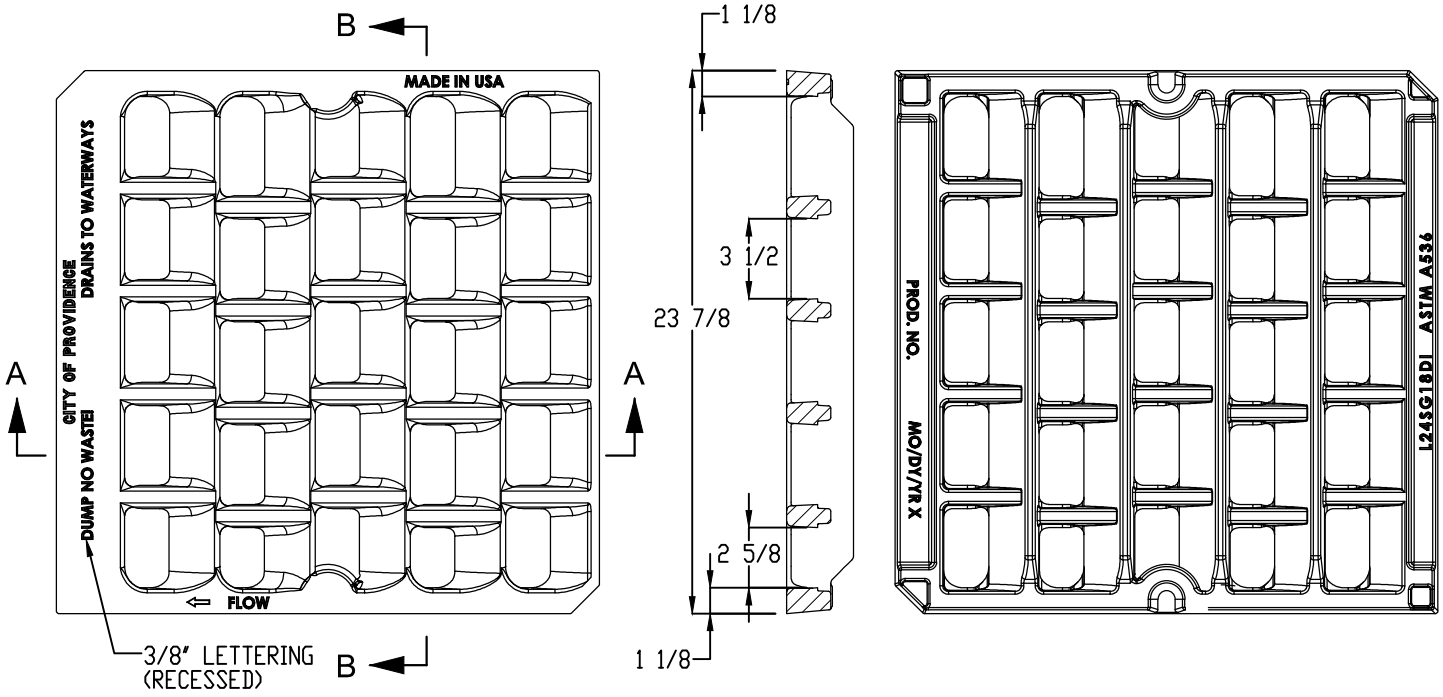
NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. THE GRATE MATERIAL SHALL BE DUCTILE IRON. MATERIALS SHALL BE ASTM A536 CERTIFIED.
3. OPEN AREA OF GRATE SHALL BE EQUAL TO OR GREATER THAN 217 SQUARE INCHES.
4. SHALL BE EJ PRODUCT 5520002 OR APPROVED EQUAL.

STANDARD CAPACITY GRATE

6.3.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



SECTION B-B

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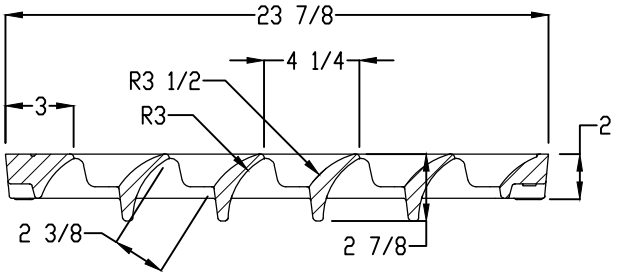


SECTION A-A

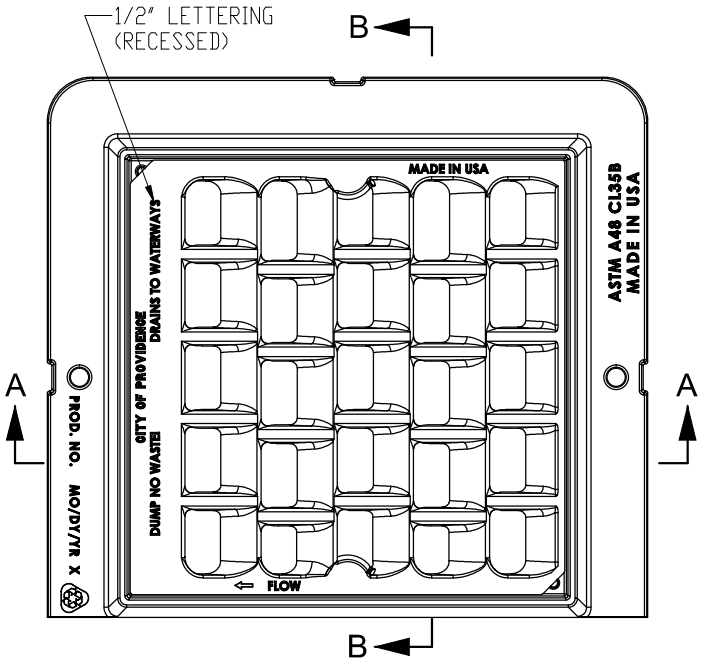
NOTES:

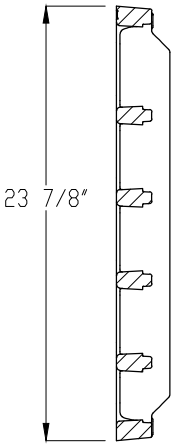
1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. THE GRATE MATERIAL SHALL BE DUCTILE IRON. MATERIALS SHALL BE ASTM A536 CERTIFIED.
3. OPEN AREA OF GRATE SHALL BE EQUAL TO OR GREATER THAN 325 SQUARE INCHES.
4. SHALL BE EJ PRODUCT 5520001 OR APPROVED EQUAL.

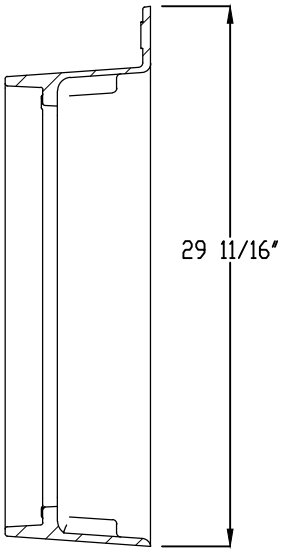
HIGH CAPACITY GRATE

6.3.3 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17







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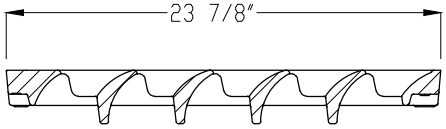
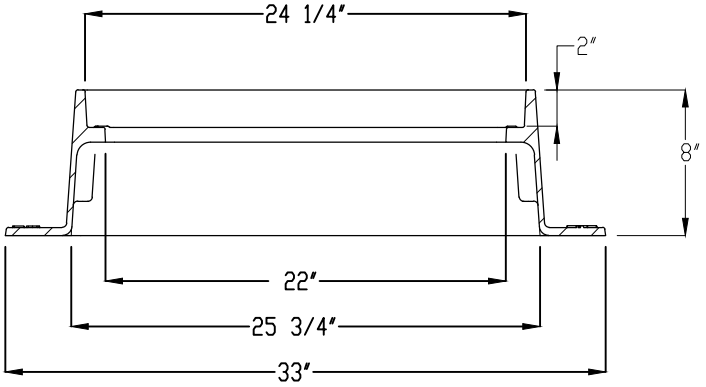




SECTION A-A

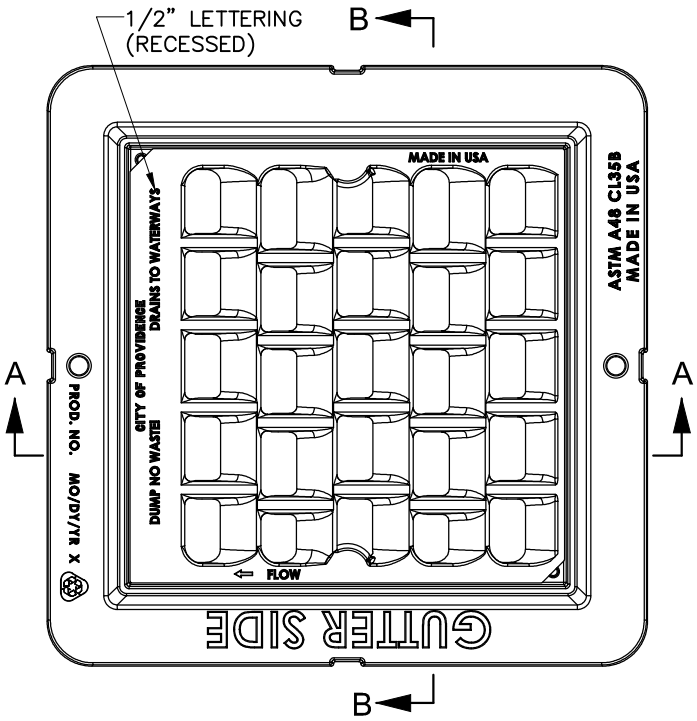
Notes:

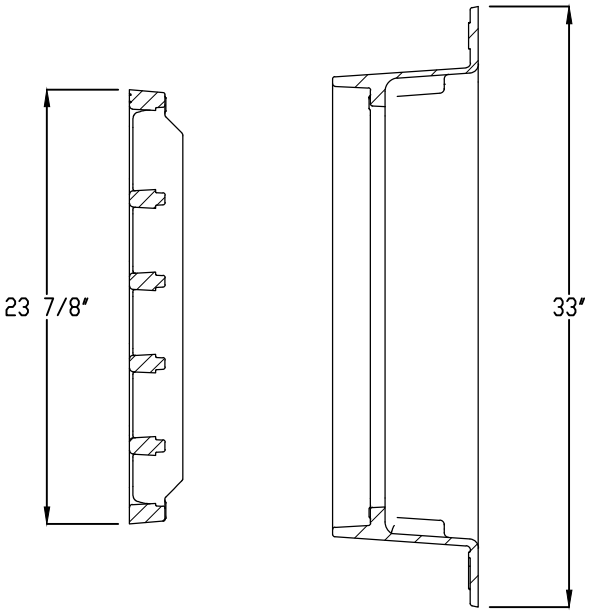
1. Materials shall conform to Section M.04 of the Rhode Island Standard Specifications.
2. The grate material shall be ductile iron and the frame material shall be grey iron. All materials shall be certified ASTM A536 and ASTM A48 respectively.
3. Open area of grate shall be equal to or greater than 325 square inches.
4. Shall be EJ Product 5520001C01 or approved equal.

HIGH CAPACITY GRATE AND THREE FLANGE FRAME

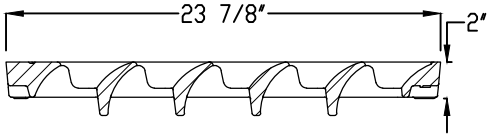
6.3.4 P
PROVIDENCE
STANDARD

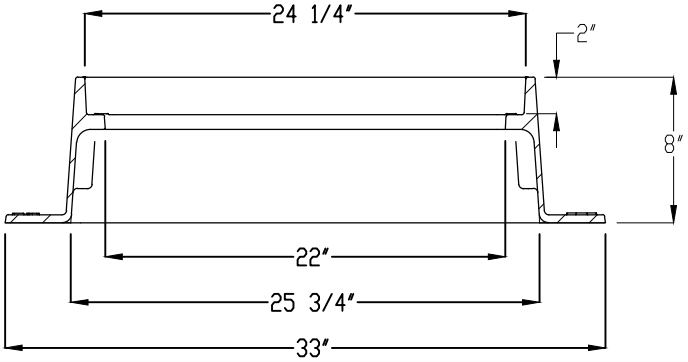
ISSUE DATE: 1/6/17





SECTION B-B





SECTION A-A

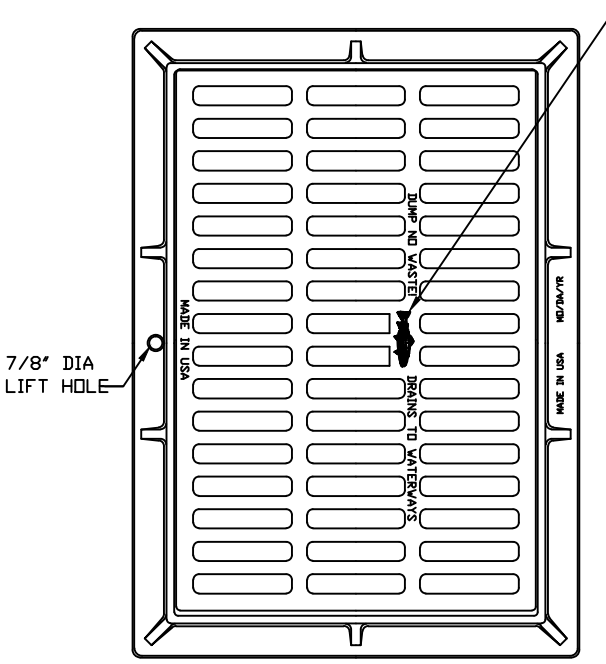
Notes:

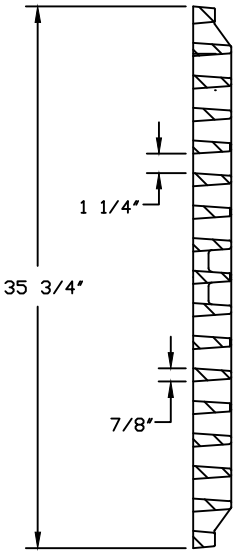
1. Materials shall conform to Section M.04 of the Rhode Island Standard Specifications.
2. The grate material shall be ductile iron and the frame material shall be grey iron. All materials shall be certified ASTM A536 and ASTM A48 respectively.
3. Open area of grate shall be equal to or greater than 325 square inches.
4. Shall be EJ Product 5520001C02 or approved equal.

HIGH CAPACITY GRATE AND FOUR FLANGE FRAME

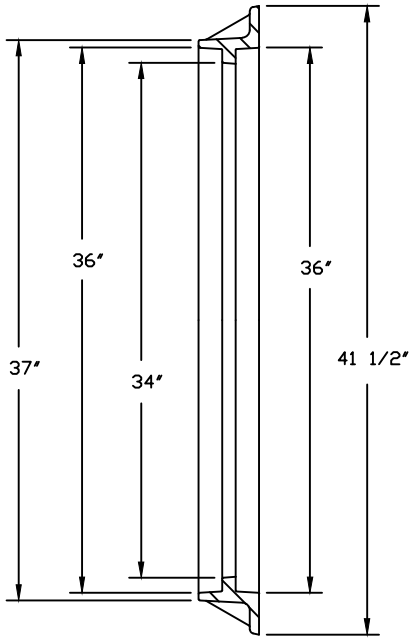
6.3.5 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17

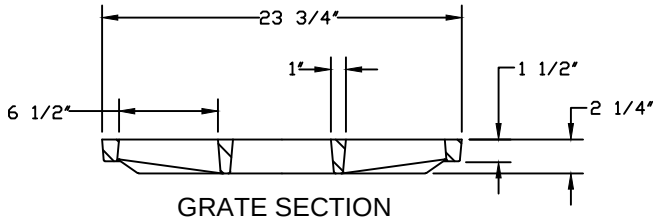




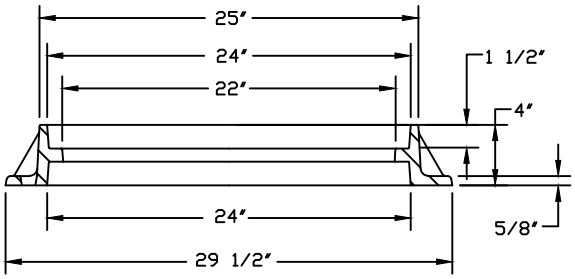
GRATE SECTION



FRAME SECTION



GRATE SECTION



FRAME SECTION

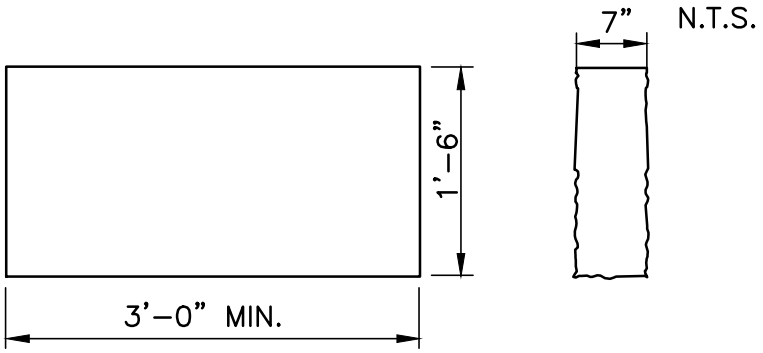
Notes:

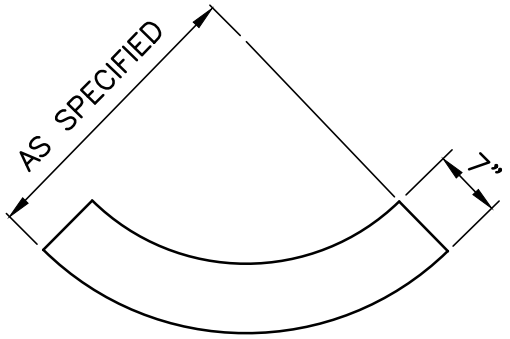
1. Materials shall conform to Section M.04 of the Rhode Island Standard Specifications.
2. All materials shall be gray iron and shall be ASTM A48 certified.
3. Open area of grate shall be equal to or greater than 390 square inches.
4. Shall be EJ Product 45660040 or approved equal.

RECTANGULAR FRAME AND GRATE

6.3.6 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17





NOTE:

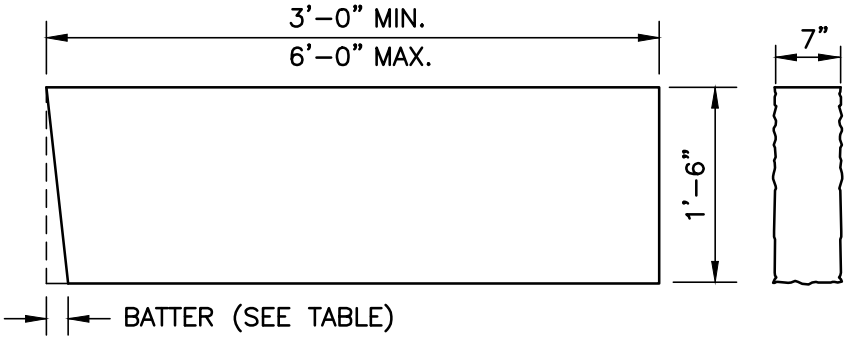
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE RI STANDARD SPECIFICATIONS.
2. TOP SURFACE TO BE DRESSED BY SAW. REMAINDER TO BE SAWCUT OR QUARRY SPLIT.
3. MINIMUM LENGTH OR CIRCULAR PIECES TO BE 3'-0".
4. CIRCULAR CURB IS REQUIRED ON CURVES AS INDICATED. STRAIGHT CURB TO BE USED ON CURVES OF MORE THAN 160'-0" RADIUS.
5. CURB TO BE SET PER PROVIDENCE CURB SETTING DETAIL.

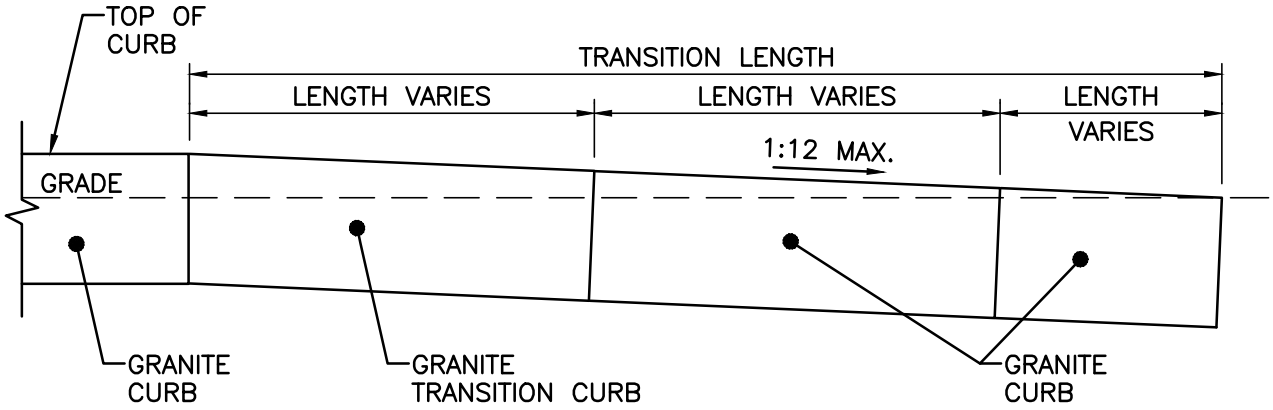
GRANITE CURB - STRAIGHT AND CIRCULAR

N.T.S.

7.3.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17





TRANSITION LENGTH (FT.)	BATTER (IN.)
6.0	1.5
7.0	1.3
8.0	1.2
9.5	1.0
11.5	0.8
15.0	0.6
18.0	0.5

NOTES:

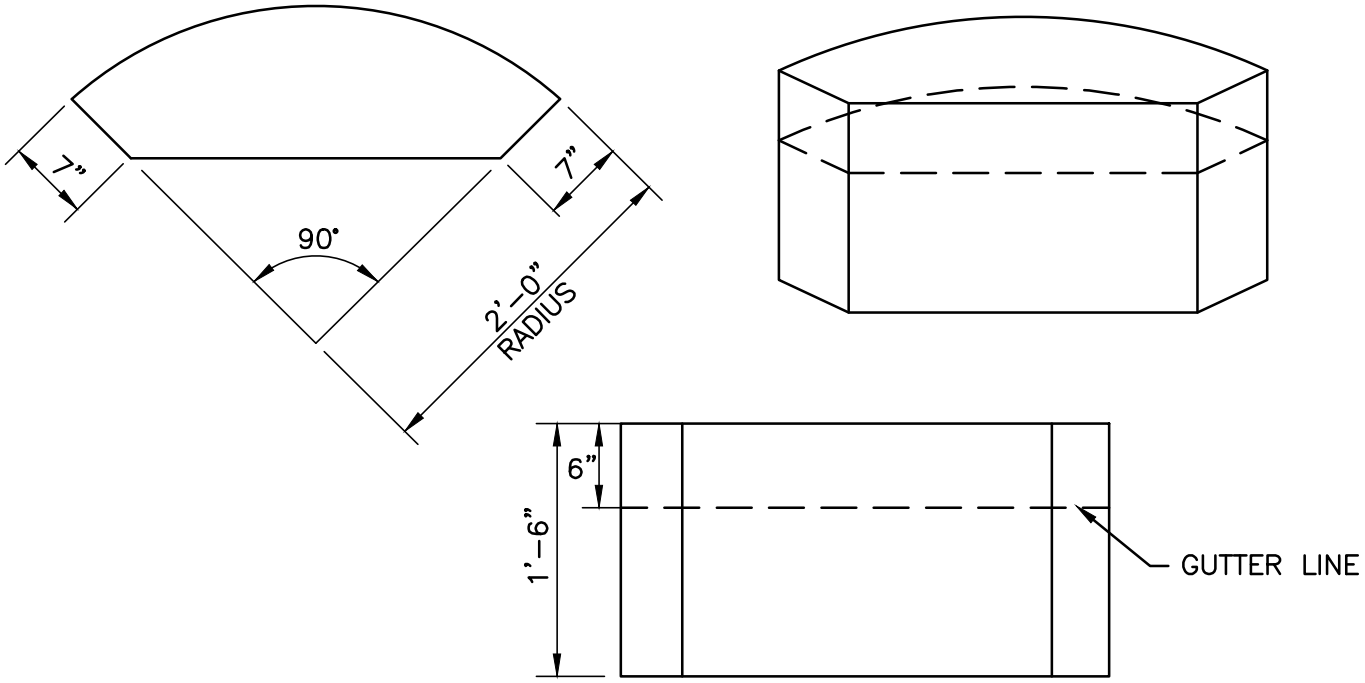
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. THE CONTRACTOR MAY CUT EXISTING CURB SECTIONS AS REQUIRED TO MEET THIS DETAIL AND THE R.I. STANDARD SPECIFICATIONS, WHERE OLD CURBING IS BEING REUSED.
3. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR CURB FILLER PIECES TO BE 3'–0"(GREATER LENGTHS PREFERRED).
4. TOP SURFACE TO BE DRESSED BY SAW. REMAINDER TO BE SAWCUT OR QUARRY SPLIT.
5. CURB TO BE SET PER PROVIDENCE CURB SETTING DETAIL.

GRANITE WHEELCHAIR RAMP TRANSITION CURB

N.T.S.

7.3.3 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



NOTES:

1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. TOP SURFACE TO BE DRESSED BY SAW. REMAINDER TO BE QUARRY SPLIT OR SAWCUT.

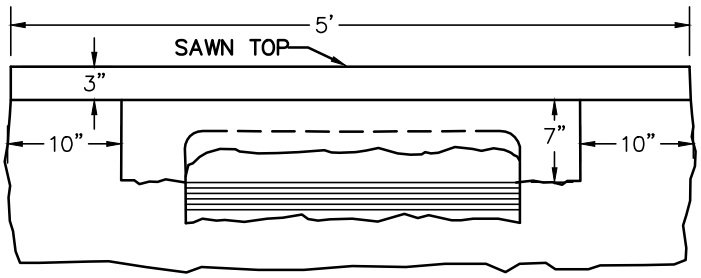
GRANITE 2'-0" RADIUS CURB RETURN

N.T.S.

7.3.4 P
PROVIDENCE
STANDARD

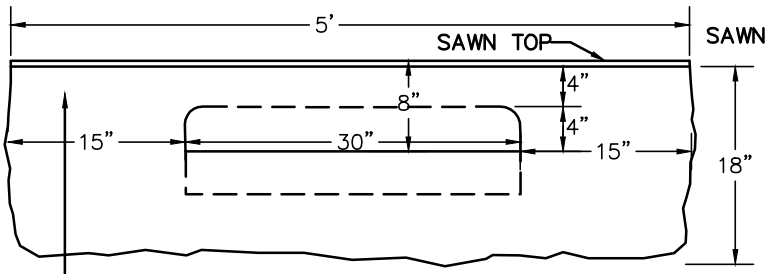
ISSUE DATE: 1/6/17

BACK SURFACE SHALL HAVE NO PROJECTIONS FOR A DISTANCE OF 3" DOWN FROM THE TOP UNLESS OTHERWISE SAWN

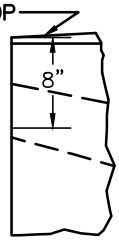


REAR VIEW
N.T.S.

QUARRY FACED WITH NO PORTIONS MORE THAN 1" ABOVE OR MORE THAN 1" BELOW A GENERAL PLANE, UNLESS OTHERWISE SAWN



FRONT VIEW
N.T.S.



END OF ALL STONES SHALL BE SQUARE AND SO FINISHED THAT WHEN STONES ARE SET NO SPACE MORE THAN 1/4" SHALL SHOW IN THE JOINT FOR THE FULL WIDTH OF THE TOP OR DOWN THE FACE FOR 9," UNLESS OTHERWISE SAWN

LOWER HALF OF ENDS MAY BE QUARRY FACED WITH NO PROJECTIONS BEYOND DEPRESSED PORTION AND NO DEPRESSION MORE THAN 1" DEEP

FRONT FACE SHALL BE AT RIGHT ANGLES TO THE PLANE OF THE TOP AND SHALL BE SMOOTH QUARRY SPLIT, UNLESS OTHERWISE SAWN

FRONT FACE SHALL HAVE NO PROJECTION GREATER THAN 3/4" OR DEPRESSION GREATER THAN 1/2" FOR A DISTANCE DOWN FROM THE TOP OF 9", UNLESS OTHERWISE SAWN

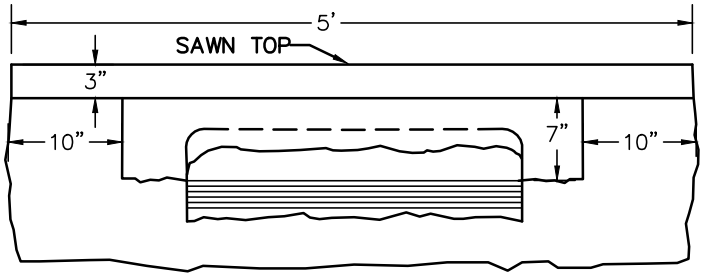
GRANITE INLET STONE - 30" OPENING

N.T.S.

7.3.5 P
PROVIDENCE
STANDARD

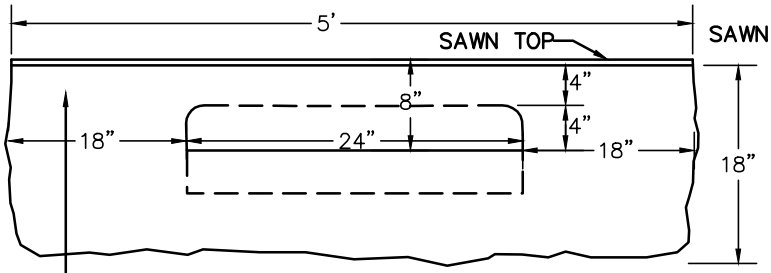
ISSUE DATE: 1/6/17

BACK SURFACE SHALL HAVE NO PROJECTIONS FOR A DISTANCE OF 3" DOWN FROM THE TOP UNLESS OTHERWISE SAWN



REAR VIEW
N.T.S.

QUARRY FACED WITH NO PORTIONS MORE THAN 1" ABOVE OR MORE THAN 1" BELOW A GENERAL PLANE, UNLESS OTHERWISE SAWN



FRONT VIEW
N.T.S.

END OF ALL STONES SHALL BE SQUARE AND SO FINISHED THAT WHEN STONES ARE SET NO SPACE MORE THAN 1/4" SHALL SHOW IN THE JOINT FOR THE FULL WIDTH OF THE TOP OR DOWN THE FACE FOR 9," UNLESS OTHERWISE SAWN

LOWER HALF OF ENDS MAY BE QUARRY FACED WITH NO PROJECTIONS BEYOND DEPRESSED PORTION AND NO DEPRESSION MORE THAN 1" DEEP

FRONT FACE SHALL BE AT RIGHT ANGLES TO THE PLANE OF THE TOP AND SHALL BE SMOOTH QUARRY SPLIT, UNLESS OTHERWISE SAWN

FRONT FACE SHALL HAVE NO PROJECTION GREATER THAN 3/4" OR DEPRESSION GREATER THAN 1/2" FOR A DISTANCE DOWN FROM THE TOP OF 9", UNLESS OTHERWISE SAWN

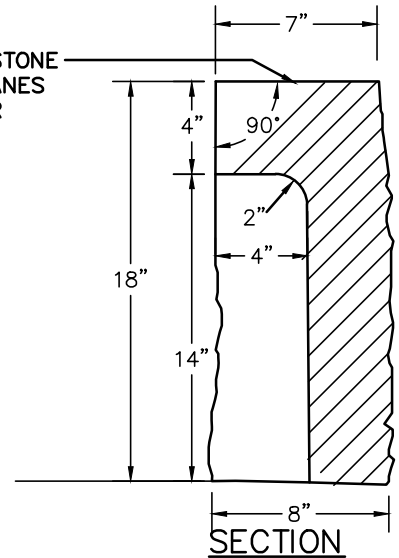
GRANITE INLET STONE - 24" OPENING

N.T.S.

7.3.6 P
PROVIDENCE STANDARD

ISSUE DATE: 1/6/17

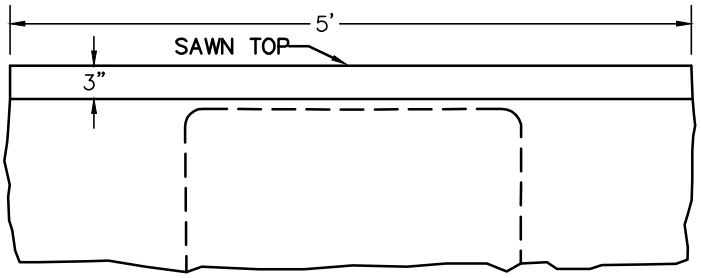
TOP SURFACE OF APRON OR REGULAR INLET STONE SHALL BE SAWN TO APPROXIMATELY TRUE PLANES TOP SURFACE SHALL HAVE NO PROJECTION OR DEPRESSION GRATER THAN 1/8".



SECTION
N.T.S.

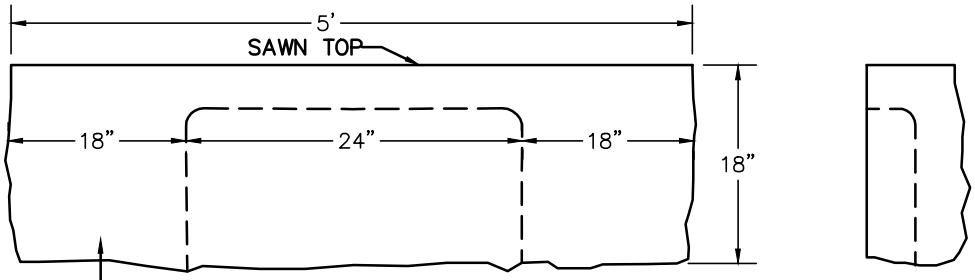
END OF ALL STONES SHALL BE SQUARE AND SO FINISHED THAT WHEN STONES ARE SET NO SPACE MORE THAN 1/4" SHALL SHOW IN THE JOINT FOR THE FULL WIDTH OF THE TOP OR DOWN THE FACE FOR 9"

QUARRY FACED WITH NO PORTIONS MORE THAN 1" ABOVE OR MORE THAN 1" BELOW A GENERAL PLANE, UNLESS OTHERWISE SAWN



REAR VIEW
N.T.S.

FRONT FACE SHALL BE AT RIGHT ANGLES TO THE PLANE OF THE TOP AND SHALL BE SMOOTH QUARRYSPLIT UNLESS OTHERWISE SAWN



FRONT VIEW
N.T.S.

LOWER HALF OF ENDS MAY BE QUARRY FACED WITH NO PROJECTIONS BEYOND DEPRESSED PORTION AND NO DEPRESSION MORE THAN 1" DEEP

FRONT FACE SHALL HAVE NO PROJECTION GREATER THAN 3/4" OR DEPRESSION GREATER THAN 1/2" FOR A DISTANCE DOWN FROM THE TOP OF 9" UNLESS OTHERWISE SAWN

GRANITE APRON STONE - 24" OPENING

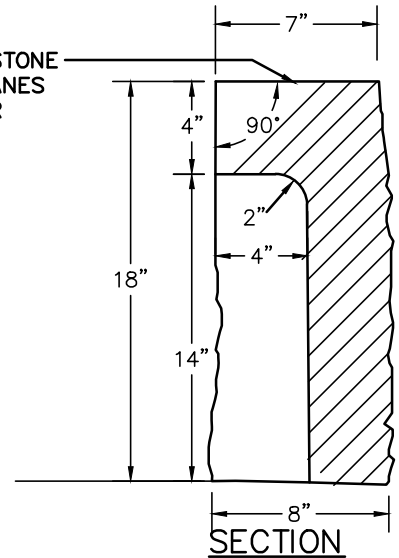
N.T.S.

7.3.7 P
PROVIDENCE STANDARD

ISSUE DATE: 1/6/17

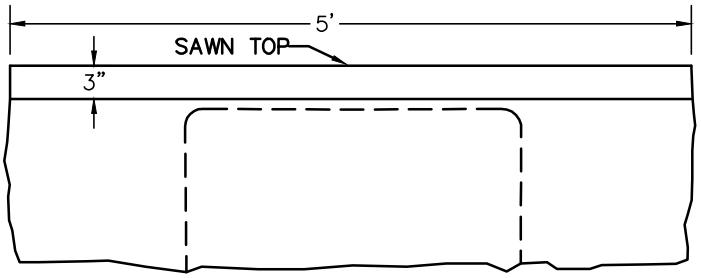
TOP SURFACE OF APRON OR REGULAR INLET STONE SHALL BE SAWN TO APPROXIMATELY TRUE PLANES TOP SURFACE SHALL HAVE NO PROJECTION OR DEPRESSION GRATER THAN 1/8".

END OF ALL STONES SHALL BE SQUARE AND SO FINISHED THAT WHEN STONES ARE SET NO SPACE MORE THAN 1/4" SHALL SHOW IN THE JOINT FOR THE FULL WIDTH OF THE TOP OR DOWN THE FACE FOR 9"



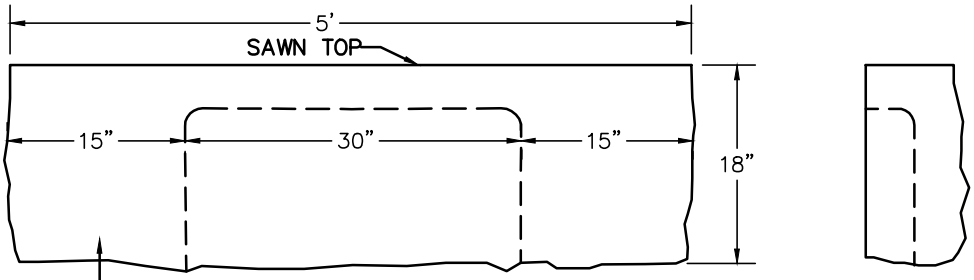
SECTION
N.T.S.

QUARRY FACED WITH NO PORTIONS MORE THAN 1" ABOVE OR MORE THAN 1" BELOW A GENERAL PLANE, UNLESS OTHERWISE SAWN



REAR VIEW
N.T.S.

FRONT FACE SHALL BE AT RIGHT ANGLES TO THE PLANE OF THE TOP AND SHALL BE SMOOTH QUARRYSPLIT UNLESS OTHERWISE SAWN



FRONT VIEW
N.T.S.

FRONT FACE SHALL HAVE NO PROJECTION GREATER THAN 3/4" OR DEPRESSION GREATER THAN 1/2" FOR A DISTANCE DOWN FROM THE TOP OF 9" UNLESS OTHERWISE SAWN

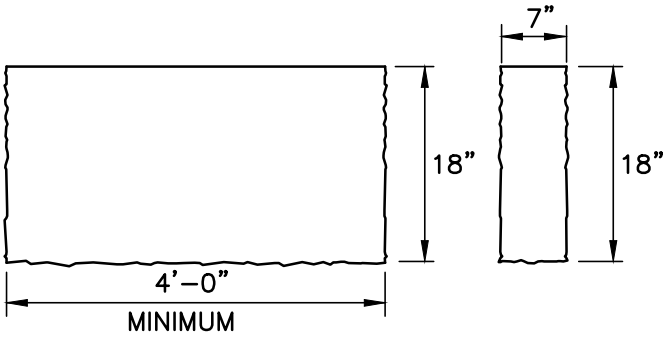
LOWER HALF OF ENDS MAY BE QUARRY FACED WITH NO PROJECTIONS BEYOND DEPRESSED PORTION AND NO DEPRESSION MORE THAN 1" DEEP

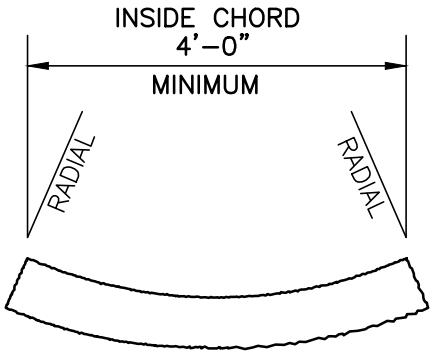
GRANITE APRON STONE - 30" OPENING

N.T.S.

7.3.8 P
PROVIDENCE STANDARD

ISSUE DATE: 1/6/17





NOTES:

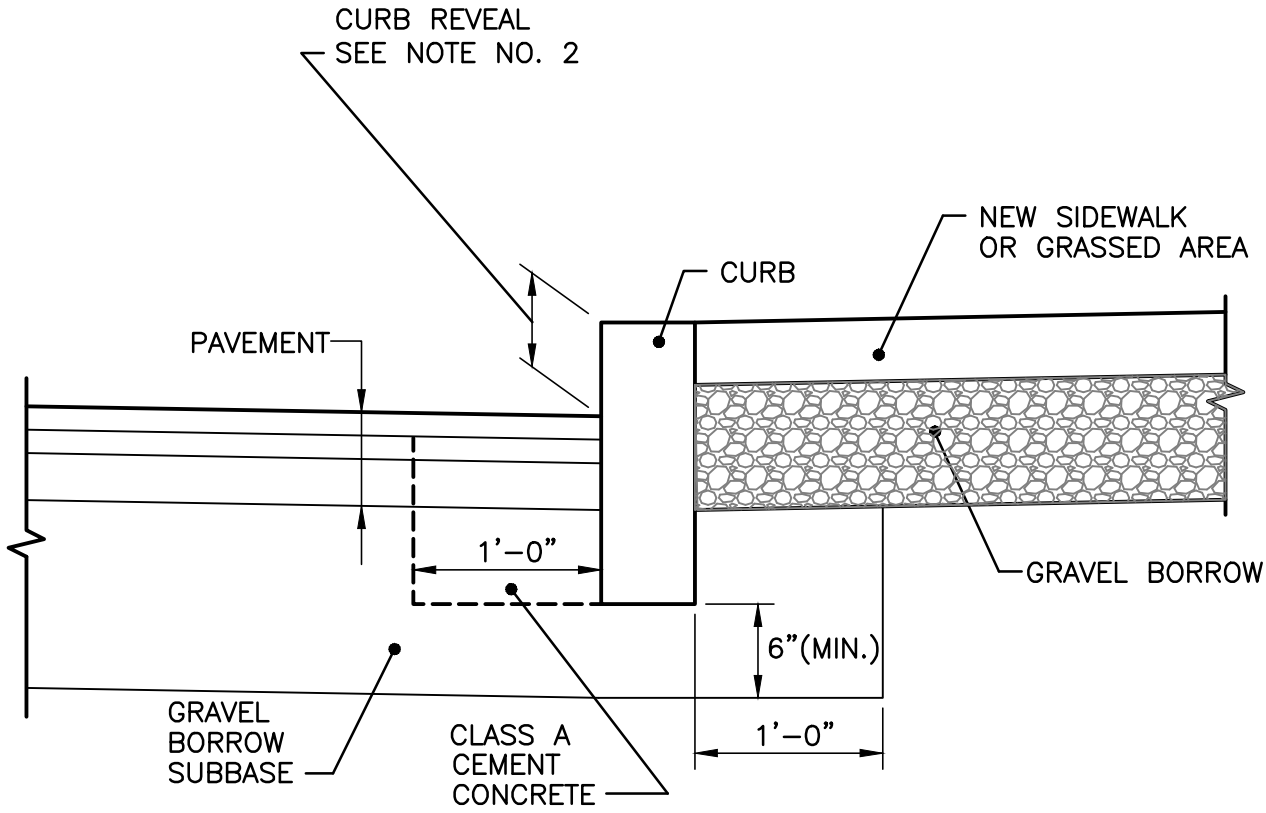
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. TOP SURFACE TO BE DRESSED BY SAW TO PROVIDE NO–SLIP SURFACE; REMAINDER MAY BE QUARRY SPLIT.
3. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR CURB FILLER PIECES TO BE 4'–0"
4. CIRCULAR RAMP STONE IS REQUIRED ON CURVES AS INDICATED. STRAIGHT RAMP STONE TO BE USED ON CURVES OF MORE THAN 160'–0" RADIUS.
5. RAMP STONE SHALL BE SET IN ACCORDANCE WITH PROVIDENCE CURB SETTING STANDARD.

GRANITE RAMP STONE

N.T.S.

7.3.9 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



NOTES:

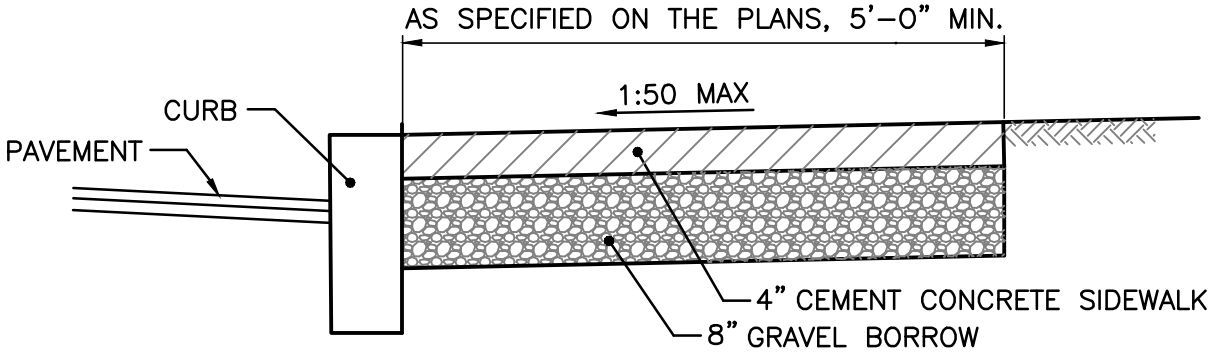
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. NEW CURBING CONSTRUCTION SHALL BE SET AT A 6 INCH REVEAL OR AS INDICATED ON PLANS OR DIRECTED BY PROVIDENCE DPW. NEW CURBING INSTALLED ADJACENT TO EXISTING CURBING SHALL MATCH THE EXISTING REVEAL OR A MINIMUM OF 4 INCHES, WHICHEVER IS GREATER. IF ADJACENT EXISTING REVEAL IS LESS THAN 4 INCHES, THE FIRST SECTION OF NEW CURB SHALL TRANSITION TO 4" REVEAL,

CURB SETTING DETAIL

N.T.S.

7.6.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



NOTES

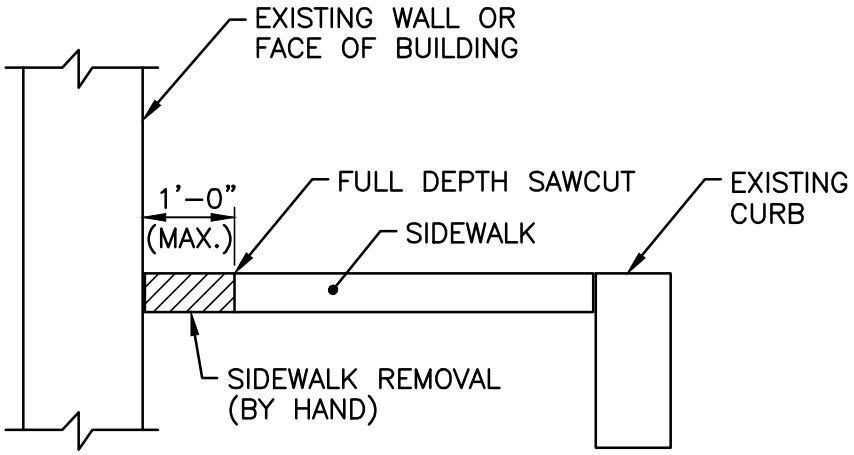
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. SEE CURB SETTING DETAIL WHERE APPLICABLE.
3. RUNNING SLOPE OF SIDEWALK SHALL NOT EXCEED 8.3% (1:12). TYPICALLY, RUNNING SLOPE SHALL MATCH ROAD SLOPE.
4. CROSS SLOPE OF SIDEWALK SHALL NOT EXCEED 2% (1:50).
5. SIDEWALK MAY BE SUBJECT TO GRASS STRIP INSTALLATION. CONSULT WITH DPW ENGINEERING
6. GRAVEL BORROW BASE SHALL COMPACT TO ACHEIVE SOIL DENSITY VALUES OF 95% MODIFIED PROCTOR DENSITY (AASHTO T180).
7. SIDEWALK REPAIRS TWENTY FEET OR LONGER ARE SUBJECT TO REQUIREMENTS HEREIN. SIDEWALK REPAIRS SHORTER THAN TWENTY FEET SHALL MAKE EVERY EFFORT TO MEET REQUIRED SLOPES.
8. CONTROLL JOINTS SHALL BE INSTALLED EVERY 5 FEET IN EACH DIRECTION.
9. EXPANSION JOINTS SHALL BE INSTALLED EVERY 20 FEET IN EACH DIRECTION AT FOUNDATIONS AND WALLS AND IN A SQUARE PATTERN AROUND MANHOLE COVERS, HYDRANTS, SIGN POSTS AND UTILITY POLES. THE EXPANSION JOINT SHALL BE THE FULL DEPTH OF THE SIDEWALK AND FILLED WITH AN APPROVED TYPE OF PREMOLDED EXPANSION JOINT FILLER.

CEMENT CONCRETE SIDEWALK

N.T.S.

43.1.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



NOTES:

1. IN AREAS WHERE SIDEWALKS ARE TO BE REMOVED IN FRONT OF EXISTING WALLS OR BUILDINGS, THE CONTRACTOR SHALL SAWCUT ONE(1) FOOT (MAXIMUM) IN FRONT OF THE WALL/BUILDING AND REMOVE THE SIDEWALK STRUCTURE BY HAND.

2. IN THE EVENT THAT THE EXISTING SIDEWALK IS A STRUCTURAL ELEMENT OF THE WALL/BUILDING, THE EXISTING SIDEWALK IN FRONT OF THESE STRUCTURES WILL REMAIN IN–PLACE AND A NEW SIDEWALK CONSTRUCTED TO MATCH THE EXISTING SECTION.

3. ANY DAMAGE TO THE WALL OR BUILDING BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.

SIDEWALK REMOVAL DETAIL

N.T.S.

43.1.1 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17

Issue Date: 1/6/17
Revised: 6/14/19

PROVIDENCE WHEELCHAIR RAMP STANDARDS

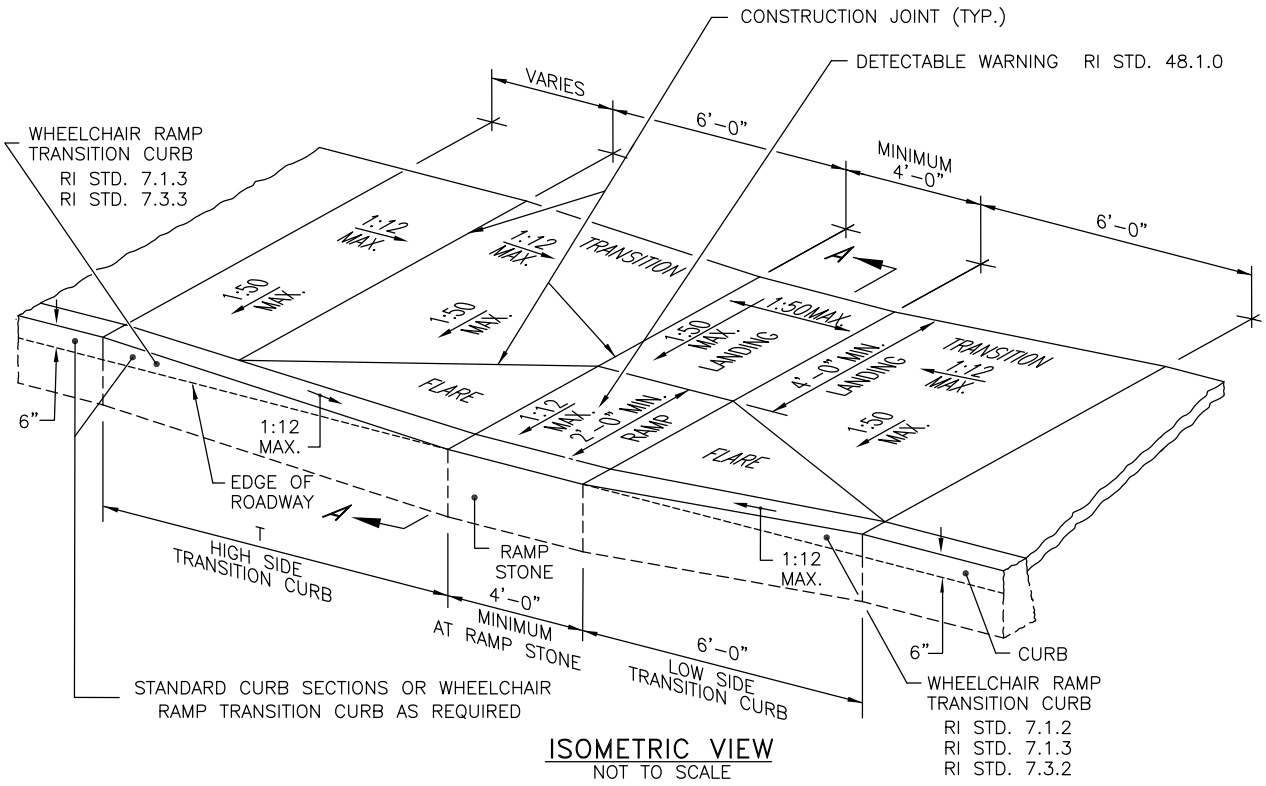
The City of Providence has adopted the Rhode Island Department of Transportation's (RIDOT) wheelchair ramp standards:

43.3.0 – Wheelchair Ramp
43.3.1 – Wheelchair Ramp for Limited Right-of-Way Areas
43.3.2 – Ramp-Landing for Narrow Sidewalk
48.1.0 – Detectable Warning Panel Placement

Please note:

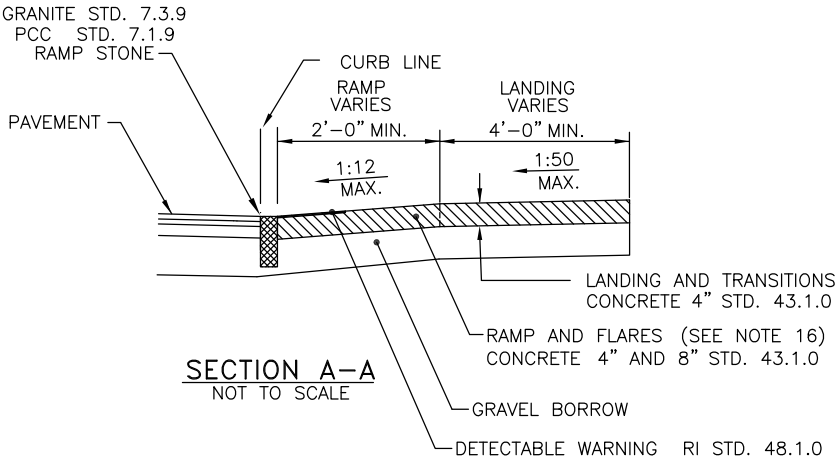
1. All sidewalks and wheelchair ramps shall be Portland cement concrete.
2. All references to curbing in the RIDOT standard details shall be Providence Standard 7" wide granite curb

DEPARTMENT OF PUBLIC WORKS
700 Allens Avenue Providence, Rhode Island 02905
401 467 7950 ph | 401 941 2567 fax
www.providenceri.com



ISOMETRIC VIEW
NOT TO SCALE

ROADWAY PROFILE GRADE	T (FT.)
0.00	6.0
0.01	7.0
0.02	8.0
0.03	9.5
0.04	11.5
0.05	15.0



SECTION A-A
NOT TO SCALE

NOTES:

1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE RI STANDARD SPECIFICATIONS.
2. WHEN ANY OBSTRUCTION LOCATED IN THE SIDEWALK FALLS WITHIN A CROSSWALK AREA, THE WHEELCHAIR RAMP SHALL BE PLACED SUCH THAT THE OBSTRUCTION FALLS OUTSIDE OF THE RAMP.
3. AT NO TIME IS ANY PART OF THE WHEELCHAIR RAMP TO BE LOCATED OUTSIDE OF THE CROSSWALK, AND IT IS TO BE CENTERED WHENEVER POSSIBLE.
4. DRAINAGE FACILITIES ARE TO BE LOCATED UP-GRADE OF ALL WHEELCHAIR RAMPS.
5. LOCATION OF WHEELCHAIR RAMPS IS AS SHOWN ON CONTRACT DRAWINGS.
6. IN NO INSTANCE SHALL THE SIDEWALK CROSS SLOPE EXCEED 1:50 EXCEPT WITHIN THE RAMP AREA.
7. AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 4'-0" SHALL BE MAINTAINED.
8. THE WHEELCHAIR RAMP SLOPE AND SIDE SLOPES (TRANSITIONS), MUST NOT BE STEEPER THAN 1:12. HOWEVER, THESE SLOPES MAY BE FLATTER THAN 1:12 WHEN WARRANTED BY SURROUNDING CONDITIONS.
9. WHERE THE ROAD PROFILE EXCEEDS 5% THE HIGH SIDE TRANSITION LENGTH (T) SHALL BE EIGHTEEN FEET (18'-0").
10. IN NO CASE, WHERE A STOP LINE IS WARRANTED, SHALL A RAMP BE PLACED BEHIND THE STOP LINE.
11. THE ENTRANCE OF THE WHEELCHAIR RAMP SHALL BE FLUSH WITH THE ROADWAY.
12. THE WHEELCHAIR RAMP SHALL BE CENTERED RADIALLY, OPPOSITE THE RADIUS POINT WHEN POSSIBLE.
13. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'-0" (GREATER LENGTHS PREFERRED).
14. ALL REQUIRED CUTTING OF CURB PIECES TO BE PAID FOR UNDER COST OF CURB.
15. DETECTABLE WARNINGS TO BE PAID FOR UNDER SECTION 942 OF THE RI STANDARD SPECIFICATIONS
16. 8" CONCRETE DEPTH FOR RADIUS WHEELCHAIR RAMPS ONLY. USE 4" DEPTH FOR TANGENT (MID-BLOCK) LOCATIONS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MLP	Oct 2005
2	MLP	Jun 2008
3	MLP	Sep 2012

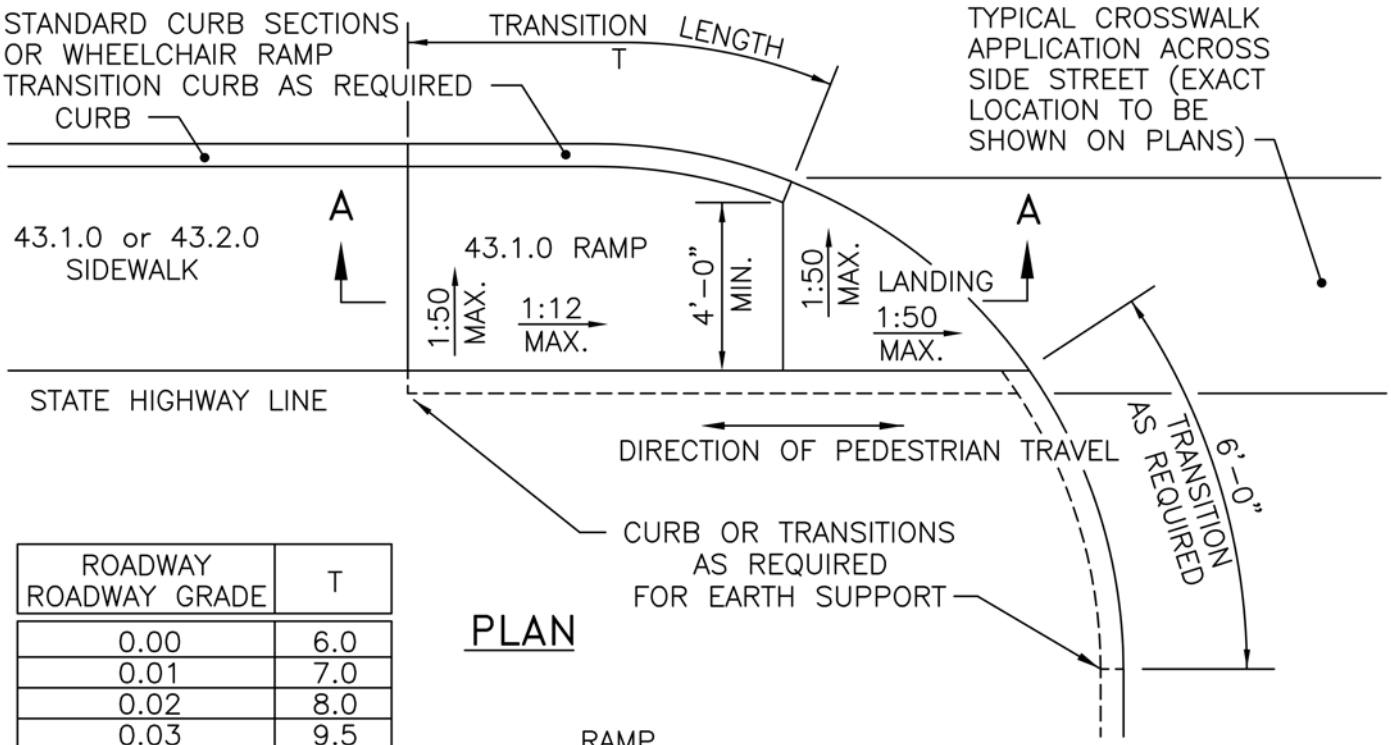
WHEELCHAIR RAMP

CHIEF ENGINEER TRANSPORTATION

CHIEF DESIGN ENGINEER TRANSPORTATION

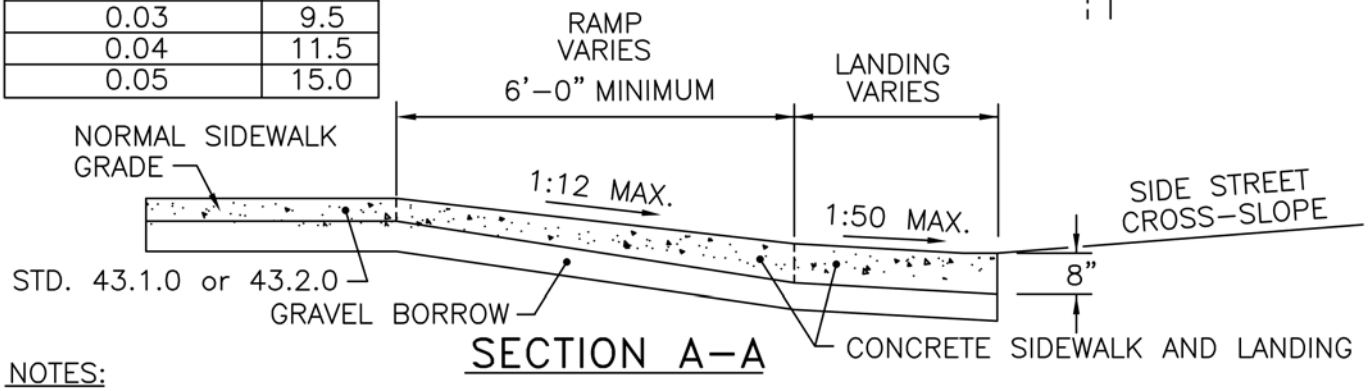
JUNE 15, 1998
ISSUE DATE

R.I. STANDARD 43.3.0



PLAN

ROADWAY ROADWAY GRADE	T
0.00	6.0
0.01	7.0
0.02	8.0
0.03	9.5
0.04	11.5
0.05	15.0



SECTION A–A

NOTES:

1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. THIS DETAIL IS TO BE USED ONLY WHEN STATE RIGHT–OF–WAY IS LIMITED TO BACK OF SIDEWALK, AND SIDEWALK IS NARROW WITH NO PEDESTRIAN TRAFFIC FROM SIDE STREET.
3. WHEN ANY OBSTRUCTION LOCATED IN THE SIDEWALK FALLS WITHIN A CROSSWALK AREA, IF POSSIBLE, THE OBSTRUCTION SHALL BE PLACED SUCH THAT IT FALLS OUTSIDE OF THE RAMP.
4. AT NO TIME IS ANY PART OF THE WHEELCHAIR RAMP TO BE LOCATED OUTSIDE OF THE CROSSWALK, AND IT IS TO BE CENTERED WHENEVER POSSIBLE.
5. DRAINAGE FACILITIES ARE TO BE LOCATED UP–GRADE OF ALL WHEELCHAIR RAMPS.
6. LOCATION OF WHEELCHAIR RAMPS IS AS SHOWN ON CONTRACT DRAWINGS.
7. ALL REQUIRED CUTTING OF CURB PIECES TO BE PAID FOR UNDER COST OF CURB.
8. WHERE THE ROAD PROFILE EXCEEDS 5% THE TRANSITION LENGTH (T) SHALL BE EIGHTEEN FEET (18'–0").
9. THE ENTRANCE OF THE WHEELCHAIR RAMP SHALL BE FLUSH WITH THE ROADWAY.
10. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'–0"(GREATER LENGTHS PREFERRED).
11. AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 4'–0" SHALL BE MAINTAINED.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MLP	Dec 2005
2	MLP	Sep 2012

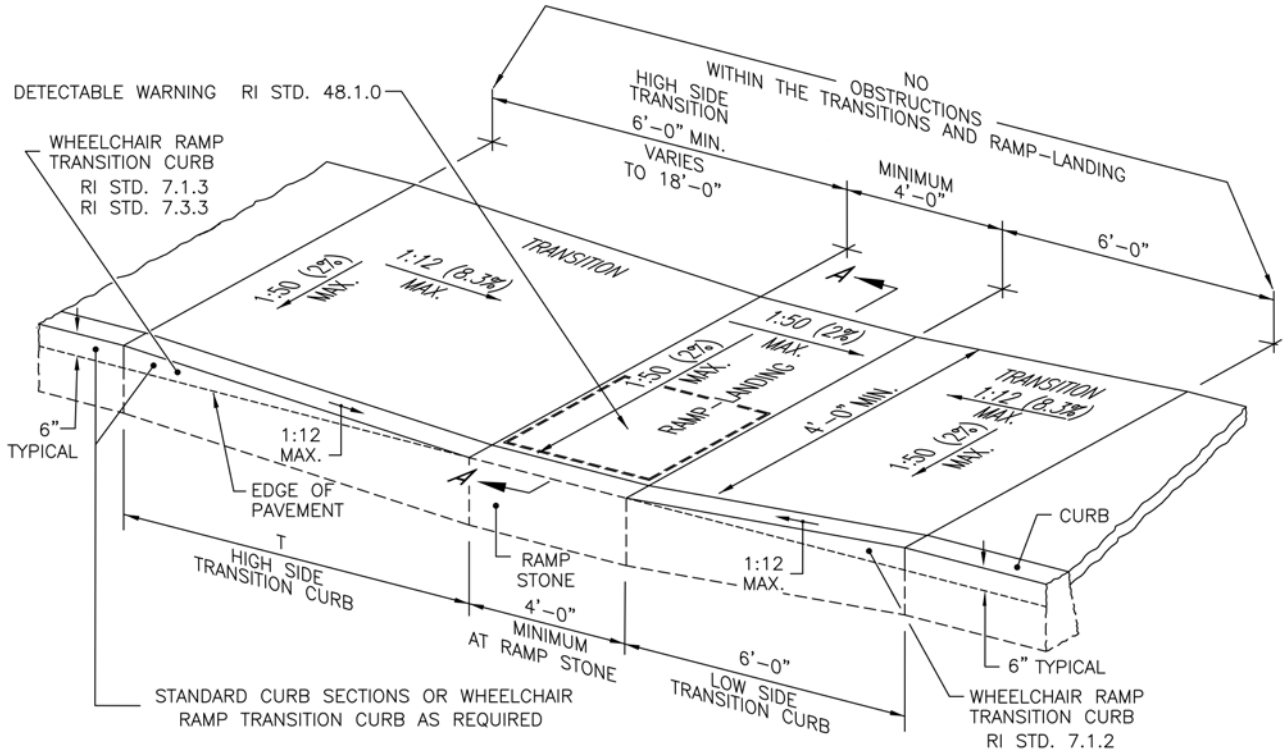
WHEELCHAIR RAMP FOR LIMITED RIGHT–OF–WAY AREAS

CHIEF ENGINEER TRANSPORTATION

CHIEF DESIGN ENGINEER TRANSPORTATION

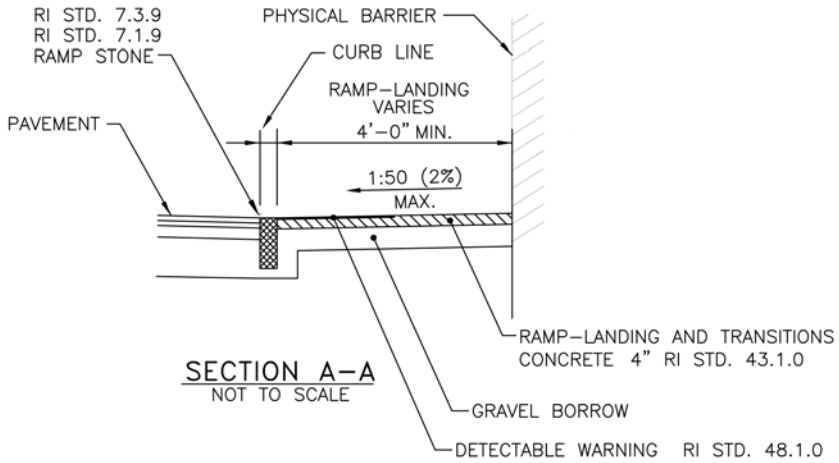
JUNE 15, 1998
ISSUE DATE

R.I. STANDARD 43.3.1



ISOMETRIC VIEW
NOT TO SCALE

ROADWAY PROFILE GRADE	T (FT.)
0.00	6.0
0.01	7.0
0.02	8.0
0.03	9.5
0.04	11.5
0.05	15.0
> 0.05	18.0



SECTION A–A
NOT TO SCALE

NOTES:

1. THIS DETAIL MAY BE USED WHEN A PHYSICAL BARRIER IS PRESENT AND THERE IS INSUFFICIENT ROOM TO PROPERLY CONSTRUCT AN ADA ACCESSIBLE RAMP AND LANDING; A TECHNICAL INFEASIBILITY FINDING IS REQUIRED.
2. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE RI STANDARD SPECIFICATIONS.
3. THE RAMP–LANDING AND TRANSITIONS SHALL BE FREE OF OBSTRUCTIONS.
4. LOCATION OF THE RAMP–LANDING IS AS SHOWN ON CONTRACT DRAWINGS.
5. AN UNOBSTRUCTED PEDESTRIAN ACCESS ROUTE (PATH OF TRAVEL) WITH A MINIMUM WIDTH OF 4'–0" SHALL BE MAINTAINED.
6. THE ENTRANCE OF THE RAMP–LANDING SHALL BE FLUSH WITH THE PAVEMENT.
7. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'–0" (GREATER LENGTHS PREFERRED).
8. ALL REQUIRED CUTTING OF CURB PIECES TO BE PAID FOR UNDER COST OF CURB.
9. DETECTABLE WARNINGS TO BE PAID FOR UNDER SECTION 942 OF THE RI STANDARD SPECIFICATIONS

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE

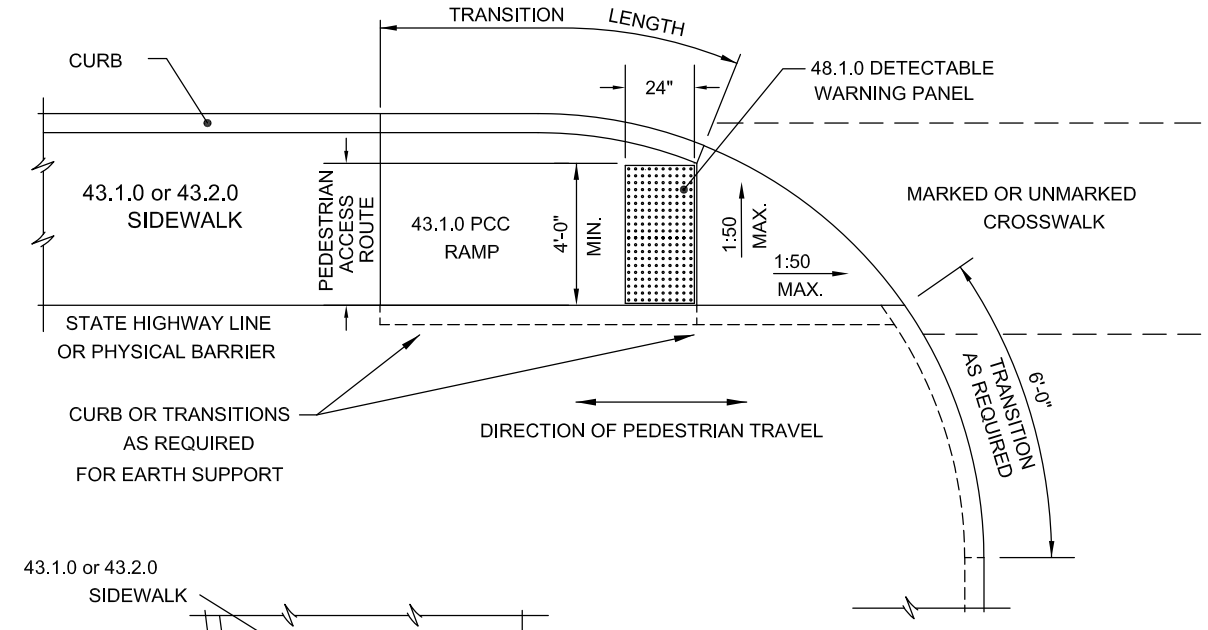
RAMP–LANDING FOR NARROW SIDEWALK

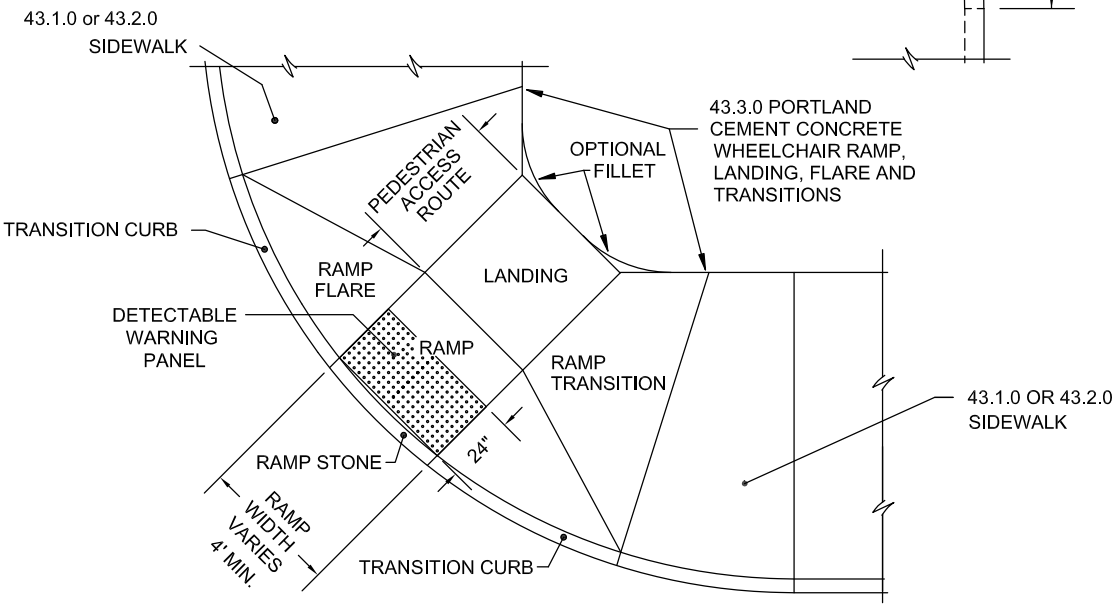
CHIEF ENGINEER TRANSPORTATION

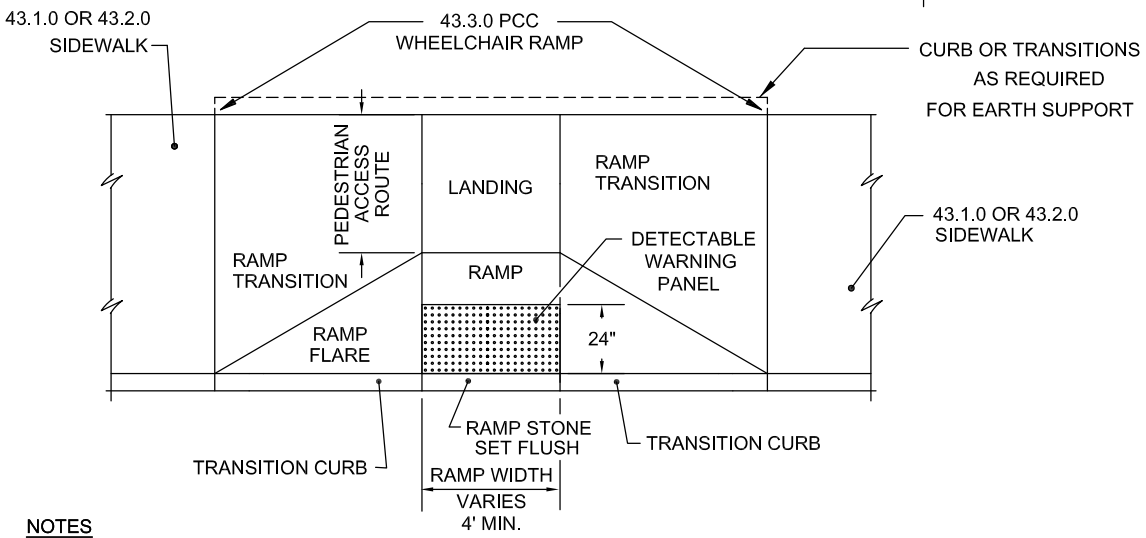
CHIEF DESIGN ENGINEER TRANSPORTATION

MARCH 31, 2015
ISSUE DATE

R.I. STANDARD 43.3.2







NOTES

1. DETECTABLE WARNING PANEL SHALL BE IN ACCORDANCE WITH SECTION 942 OF THE RHODE ISLAND STANDARD SPECIFICATIONS; PANEL TO MATCH RAMP WIDTH.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MLP	Mar 2005
2	MLP	Sep 2012

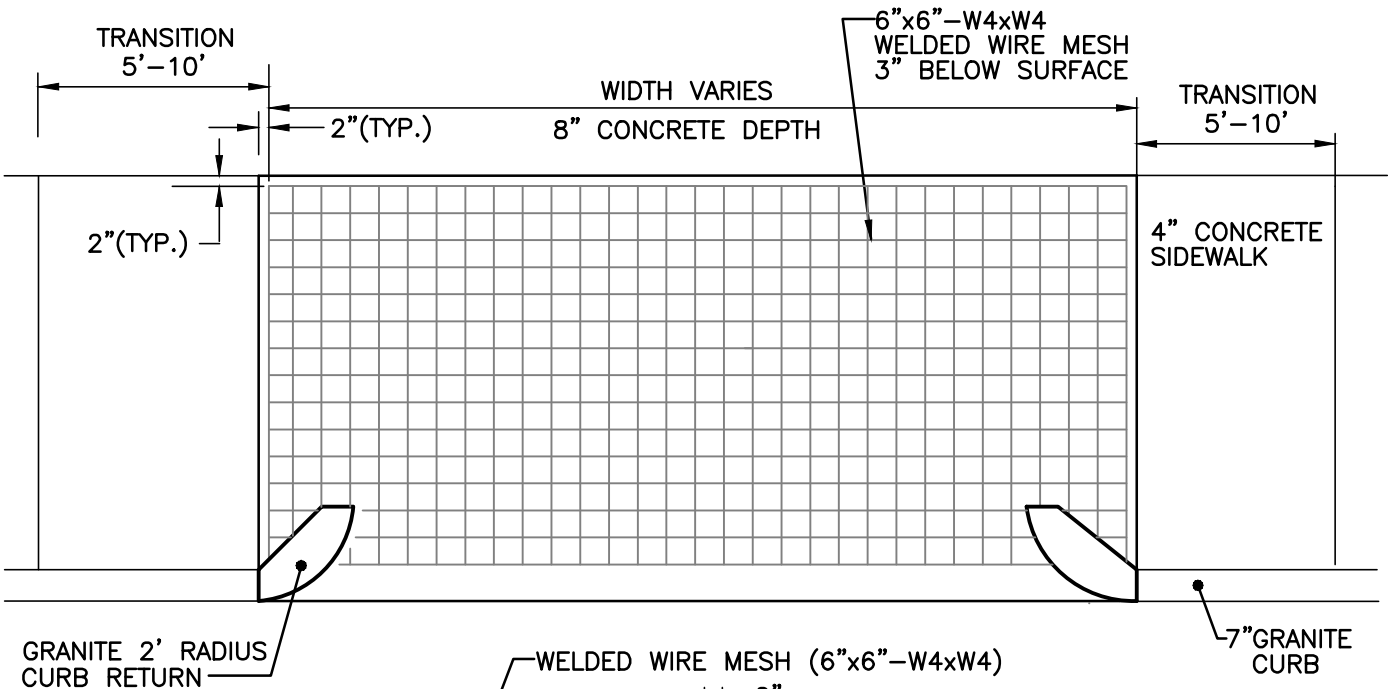
DETECTABLE WARNING PANEL PLACEMENT

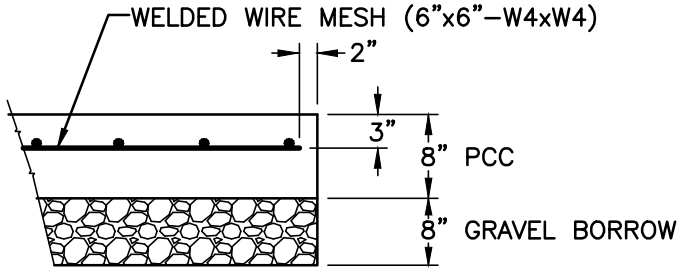
CHIEF ENGINEER TRANSPORTATION

CHIEF DESIGN ENGINEER TRANSPORTATION

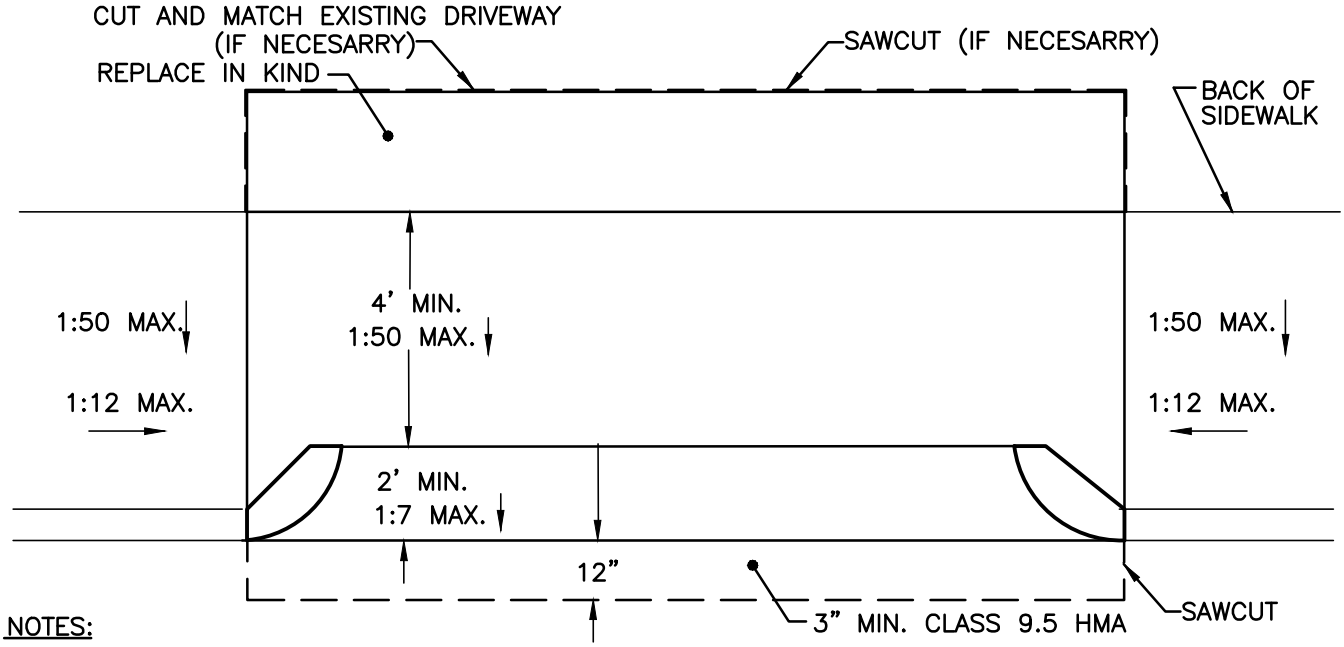
JUNE 15, 1998
ISSUE DATE

R.I. STANDARD 48.1.0





DRIVEWAY SECTION



NOTES:

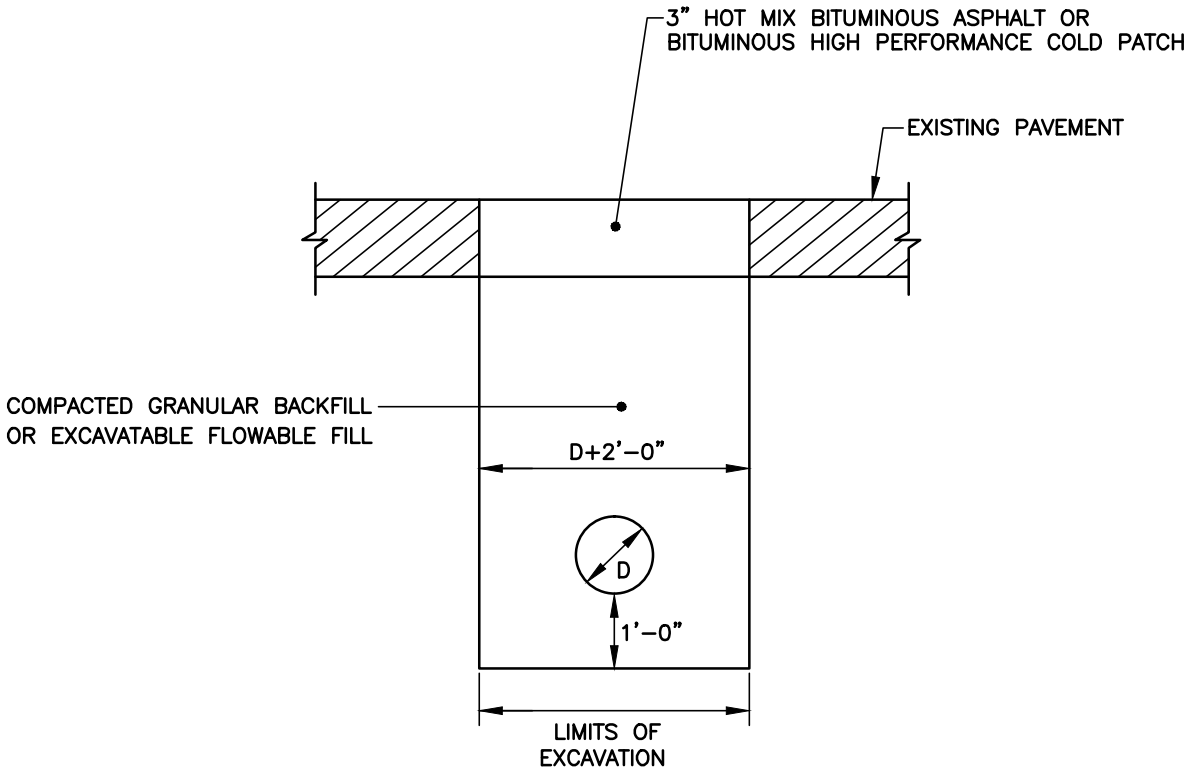
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE RIDOT STANDARD SPECIFICATIONS.
2. RUNNING SLOPE OF SIDEWALK/DRIVEWAY SHALL NOT EXCEED 8.3% (1:12)
3. 4' MINIMUM ACCESSIBLE PATH SHALL BE INSTALLED WITH CROSS SLOPE NOT EXCEEDING 2% (1:50)
4. RESIDENTIAL CURB CUTS SHALL BE NO WIDER THAN 12' FROM INSIDE OF CURB RETURNS.

CEMENT CONCRETE DRIVEWAYS

N.T.S.

43.5.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17, REVISED 10/6/17



NOTES:

1. BITUMINOUS CONCRETE SHALL ADHERE TO RIDOT STANDARD SPECIFICATIONS, SECTION 401.
2. GRANUAL BASE MATERIAL SHALL BE COMPACTED TO 95% OF MODIFIED PROCTOR DENSITY (AASHTO T180), AND SHALL ADHERE TO RIDOT STANDARD SPECIFICATIONS, SECTION 301.
3. EXCAVATABLE FLOWABLE FILL (CONTROLLED DENSITY FILL, CDF) SHALL ADHERE TO RIDOT STANDARD SPECIFICATIONS, SECTION 603.
4. ANY TEMPORARY PATCH INSTALLED PRIOR TO SEPTEMBER 1 IN ANY YEAR SHALL BE REPLACED WITH PERMANENT PATCH NO LATER THAN DECEMBER 1 OF THAT YEAR.

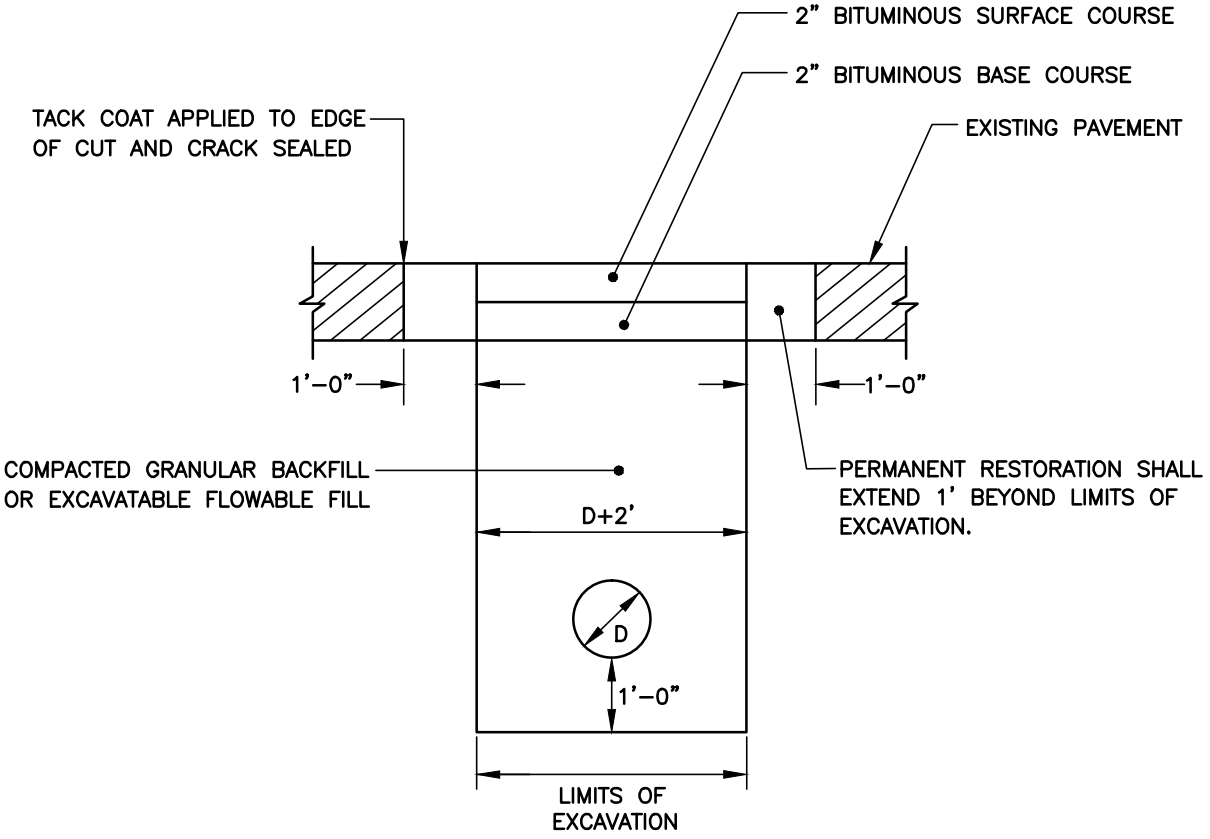
   TEMPORARY PATCHES MADE BETWEEN SEPTEMBER 1 AND MARCH 30 SHALL BE MAINTAINED BY THE PERMITTEE UNTIL A PERMANENT PATCH CAN BE INSTALLED, NO LATER THAN JUNE 15.
5. IF TEMPORARY PATCH IS INSTALLED, PERMITTEE MAY ALLOW NO MORE THAN 45 DAYS FOR SETTLING BEFORE PERMANENT RESTORATION. THE PERMITTEE SHALL BE RESPONSIBLE TO MAINTAIN TEMPORARY ROADWAY RESTORATIONS IN A SAFE CONDITION FOR ALL TYPES OF TRAVEL UNTIL A PERMANENT PAVEMENT REPAIR HAS BEEN MADE. TO ENSURE PROPER MAINTENANCE, THE PERMITTEE SHALL PERFORM PERIODIC INSPECTION OF EACH TEMPORARY PATCH UNTIL IT IS REPLACED WITH A PERMANENT PATCH.

TEMPORARY ROADWAY RESTORATION

N.T.S.

60.1.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



NOTES:

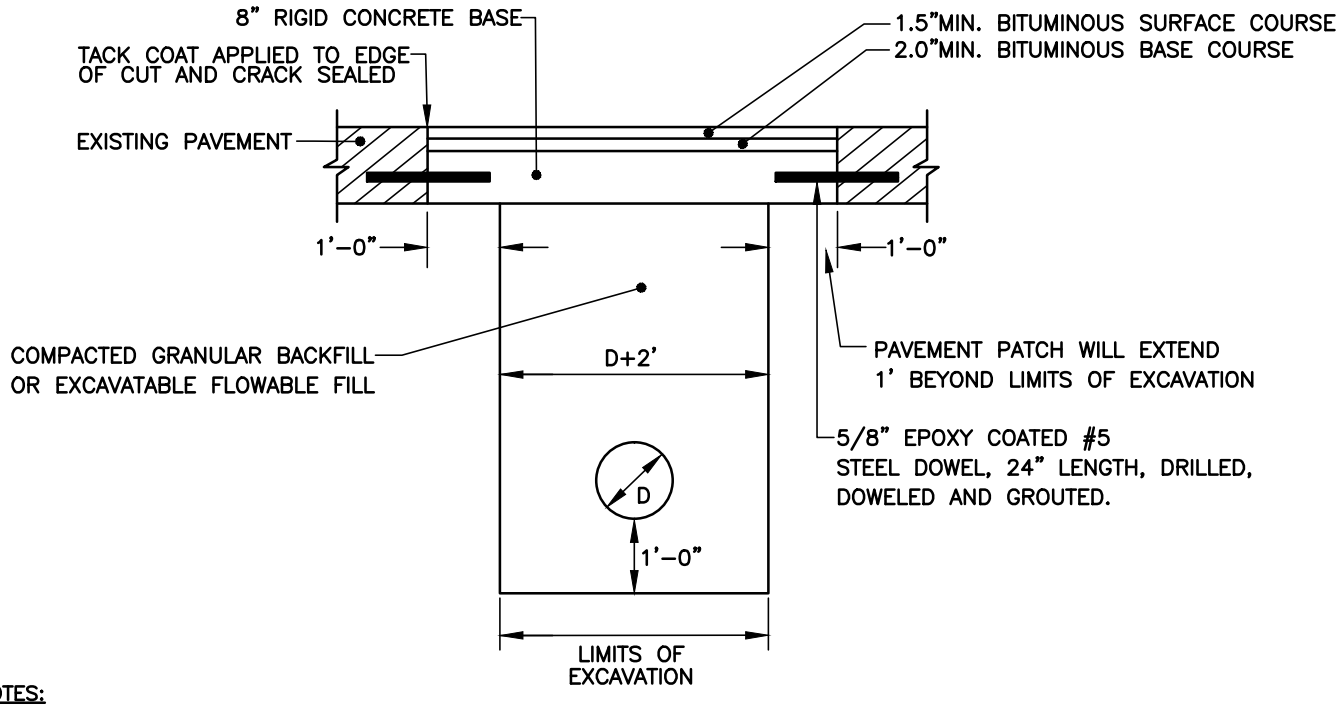
1. BITUMINOUS CONCRETE SHALL ADHERE TO RIDOT SPECIFICATIONS, SECTION 401.
2. GRANUAL BASE MATERIAL SHALL BE COMPACTED TO 95% OF MODIFIED PROCTOR DENSITY (AASHTO T180). GRAVEL BASE COURSE SHALL ADHERE TO RIDOT SPECIFICATIONS, SECTION 301.
3. EXCAVATABLE FLOWABLE FILL (CONTROLLED DENSITY FILL, CDF) SHALL ADHERE TO 95% OF THE MODIFIED PROCTOR DENSITY (AASHTO T180), ADHERING TO RIDOT SPECIFICATIONS, SECTION 603.
4. PRIOR TO PERMANENT RESTORATION, ALL EDGES OF THE EXCAVATED AREA AND ONE FOOT BEYOND SHALL BE SAWCUT TO A CLEAN, SQUARE EDGE.
5. IF EXCAVATION IS ON A PROTECTED STREET, THE REMAINING ROADWAY OUTSIDE THE TRENCH TO THE NEAREST CURB SHALL BE MILLED 1.5 INCHES WITH 1.5 INCH BITUMINOUS CONCRETE SURFACE OVERLAY. THE JOINTS SHALL BE SEALED USING INFRARED TECHNOLOGY. THE LENGTH OF THE NEW PAVED AREA MUST BE A MINIMUM OF 10 FEET TO ALLOW FOR PROPER ROLLING.
6. IF EXCAVATION IS ON A NON-PROTECTED STREET, AND THE DISTANCE FROM EDGE OF EXCAVATION TO EDGE OF ROADWAY IS TWO FEET OR LESS, THE REMAINING AREA TO EDGE OF ROADWAY SHALL BE REMOVED AND REPLACED IN CONJUNCTION WITH THE PERMANENT PAVEMENT RESTORATION.

PERMANENT ROADWAY RESTORATION - GRANULAR BASE

N.T.S.

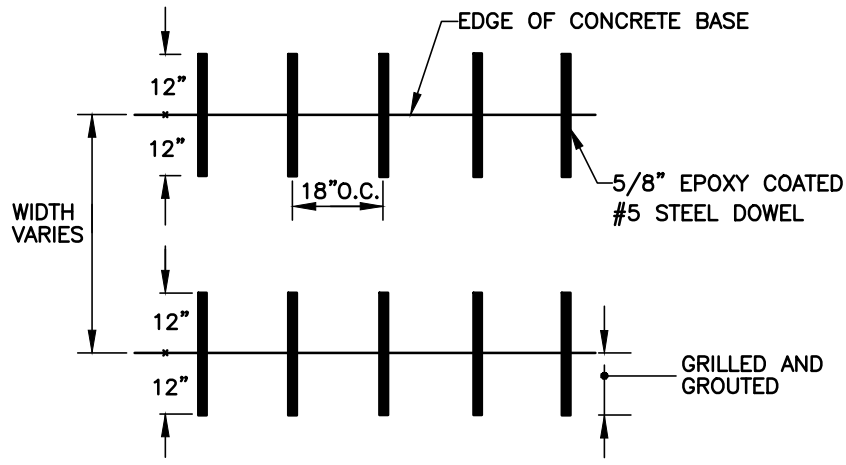
60.2.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



NOTES:

1. CONCRETE ROAD BASE MUST BE RESTORED TO THE EXISTING DEPTH OR A MINIMUM OF 8 INCHES. A MINIMUM OF 3.5 INCHES OF BITUMINOUS CONCRETE SURFACE COURSE MEETING RIDOT SPECIFICATIONS, SECTION 401 SHALL BE PLACED OVER BASE.
2. 8 INCH RIGID CONCRETE BASE SHALL BE TYPE XX (28 DAY -4000 PSI) PER RIDOT SPECIFICATIONS, SECTION 601.
3. PRIOR TO PERMANENT RESTORATION, ALL EDGES OF THE EXCAVATED AREA AND ONE FOOT BEYOND SHALL BE SAWCUT TO A CLEAN, SQUARE EDGE.
4. GRANULAR SUBGRADE MATERIAL SHALL BE COMPACTED TO 95% OF THE MODIFIED PROCTOR DENSITY (AASHTO T80), MEETING RIDOT SPECIFICATIONS, SECTION 301.
5. EXCAVATABLE FLOWABLE FILL (CONTROLLED DENSITY FILL, CDF) SHALL ADHERE TO RIDOT SPECIFICATIONS, SECTION 603.
6. IF EXCAVATION IS ON A PROTECTED STREET, THE REMAINING ROADWAY OUTSIDE THE TRENCH TO THE NEAREST CURB SHALL BE MILLED 1.5 INCHES WITH A 1.5 INCH BITUMINOUS CONCRETE SURFACE OVERLAY. THE JOINTS SHALL BE SEALED USING INFRARED TECHNOLOGY. THE LENGTH OF THE NEW PAVED AREA MUST BE A MINIMUM OF 10 FEET TO ALLOW FOR PROPER COMPACTION.
7. IF EXCAVATION IS ON NON PROTECTED STREET, AND THE DISTANCE FROM EDGE OF EXCAVATION TO EDGE OF ROADWAY IS TWO FEET OR LESS, THE REMAINING AREA TO SUCH EDGE OF ROADWAY SHALL BE REMOVED AND REPLACED IN CONJUNCTION WITH THE PERMANENT PAVEMENT RESTORATION.



CONCRETE BASE DOWEL DETAIL

NOTES:

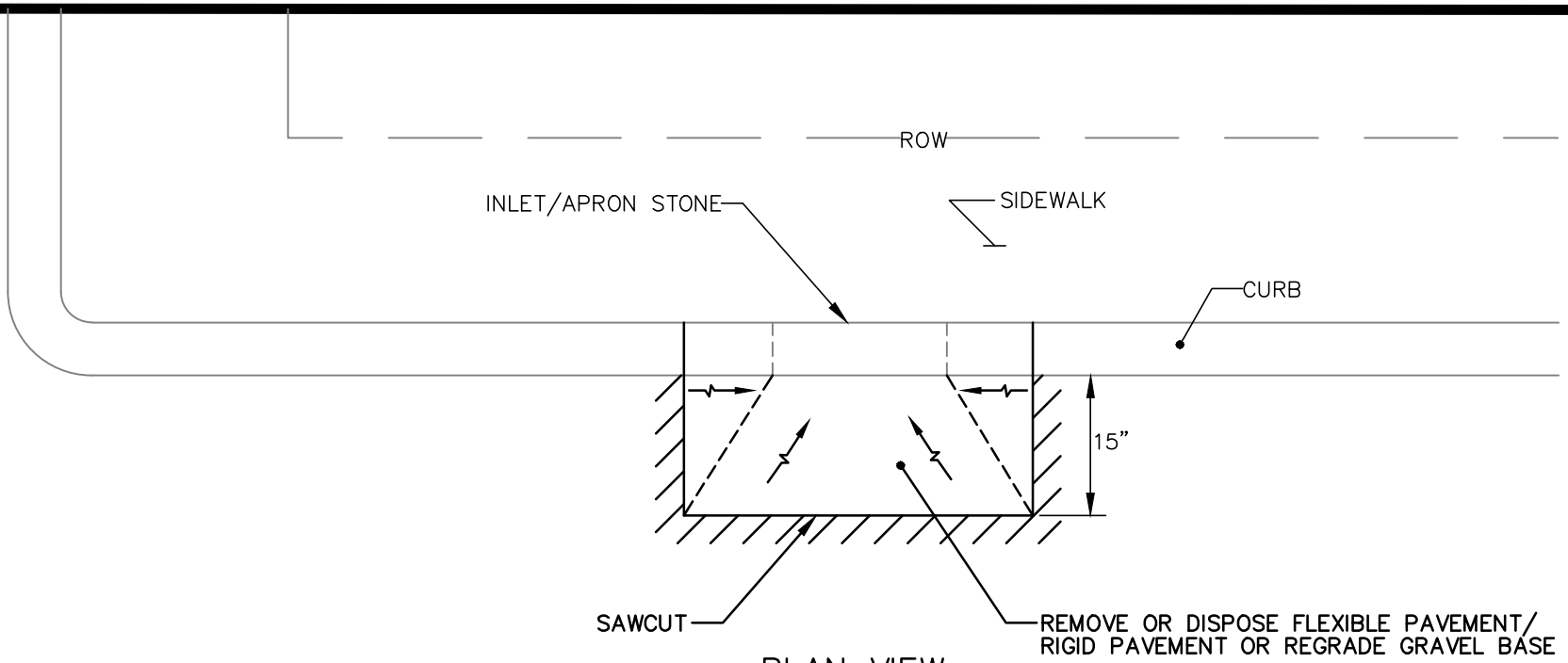
1. DOWEL SHALL BE INSTALLED 4" FROM SURFACE OF CONCRETE BASE.
2. THE EXISTING CONCRETE ROAD BASE SHALL BE DRILLED AND GROUTED EVERY 18" ON CENTER TO RECIEVE THE EPOXY COATED STEEL DOWELS.

PERMANENT ROADWAY RESTORATION - CONCRETE BASE

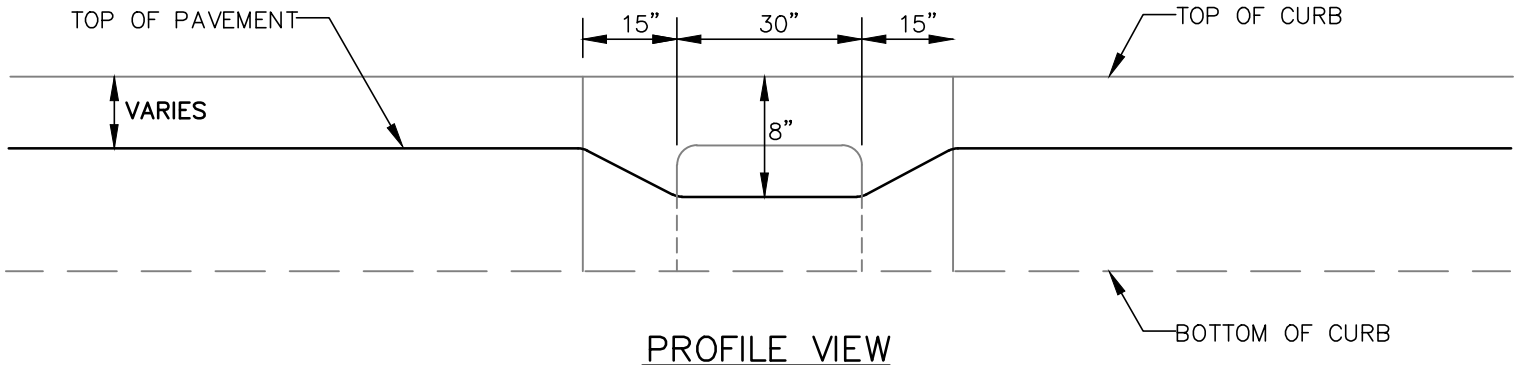
N.T.S.

60.3.0 P
PROVIDENCE
STANDARD

ISSUE DATE: 1/6/17



PLAN VIEW
N.T.S.



PROFILE VIEW
N.T.S.

NOTES: 1. FLEXIBLE/RIGID PAVEMENT AND/OR GRAVEL BASE SHALL BE GRADED TO DRAIN TO 8" BELOW THE TOP OF CURB.

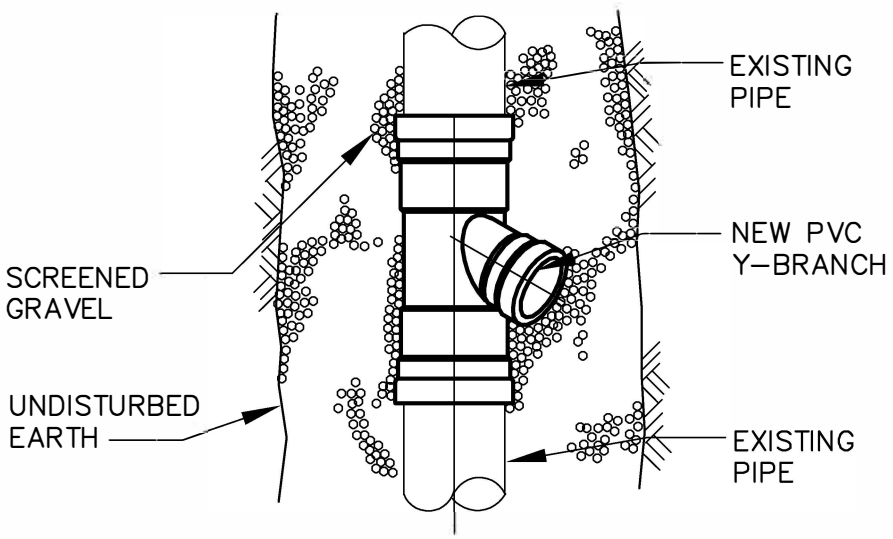
2. ITEMS SHALL BE PAID AT RESPECTIVE BID PRICES

INLET / APRON STONE REVEAL

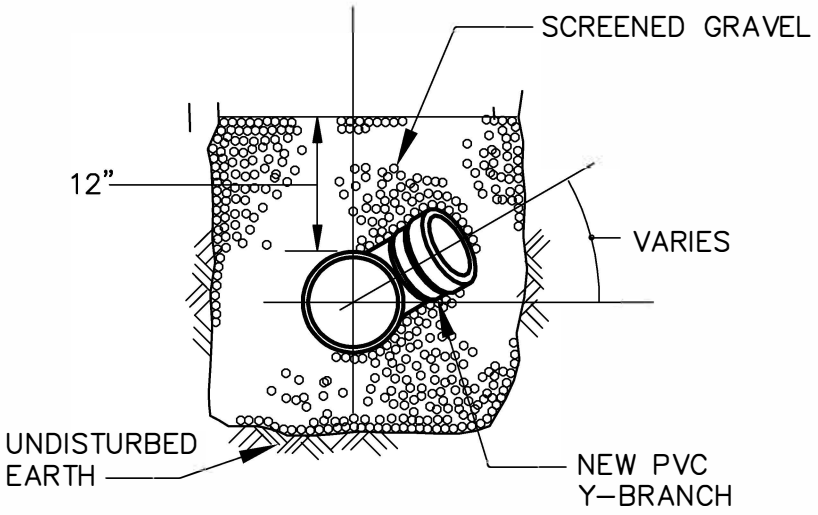
N.T.S.

60.4.0 P
PROVIDENCE STANDARD

ISSUE DATE: 1/6/17



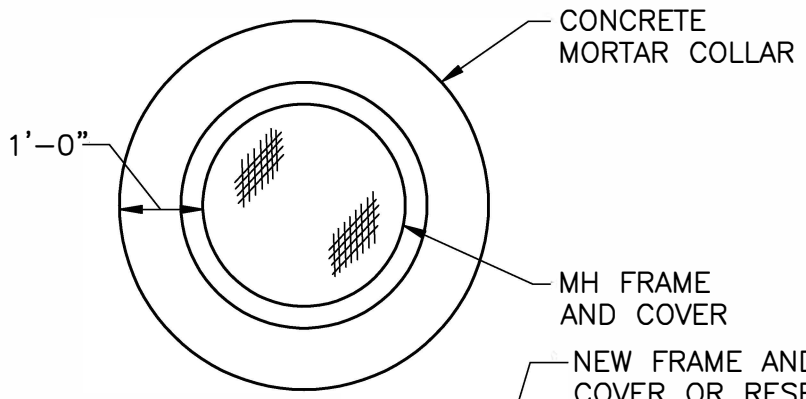
PLAN



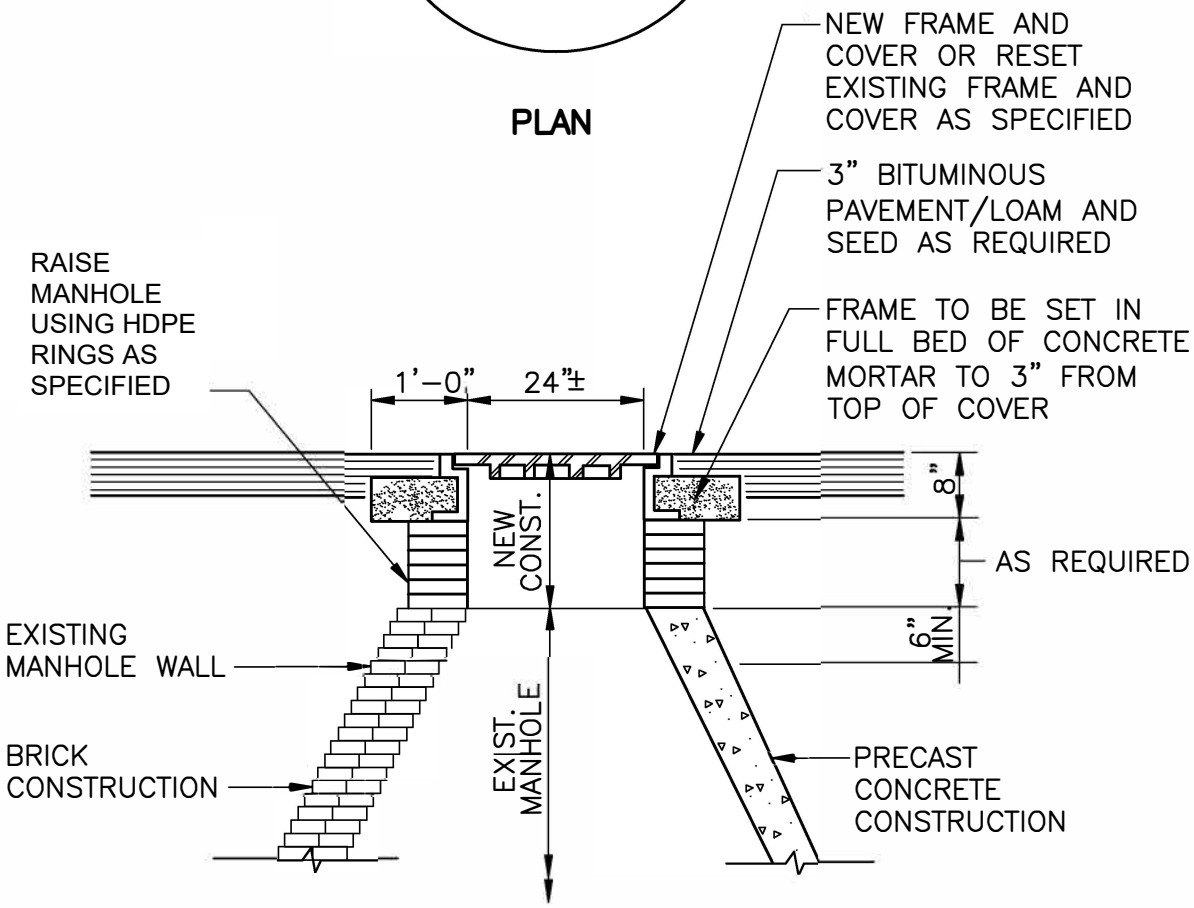
SECTION

WYE BRANCH DETAIL

NTS



PLAN

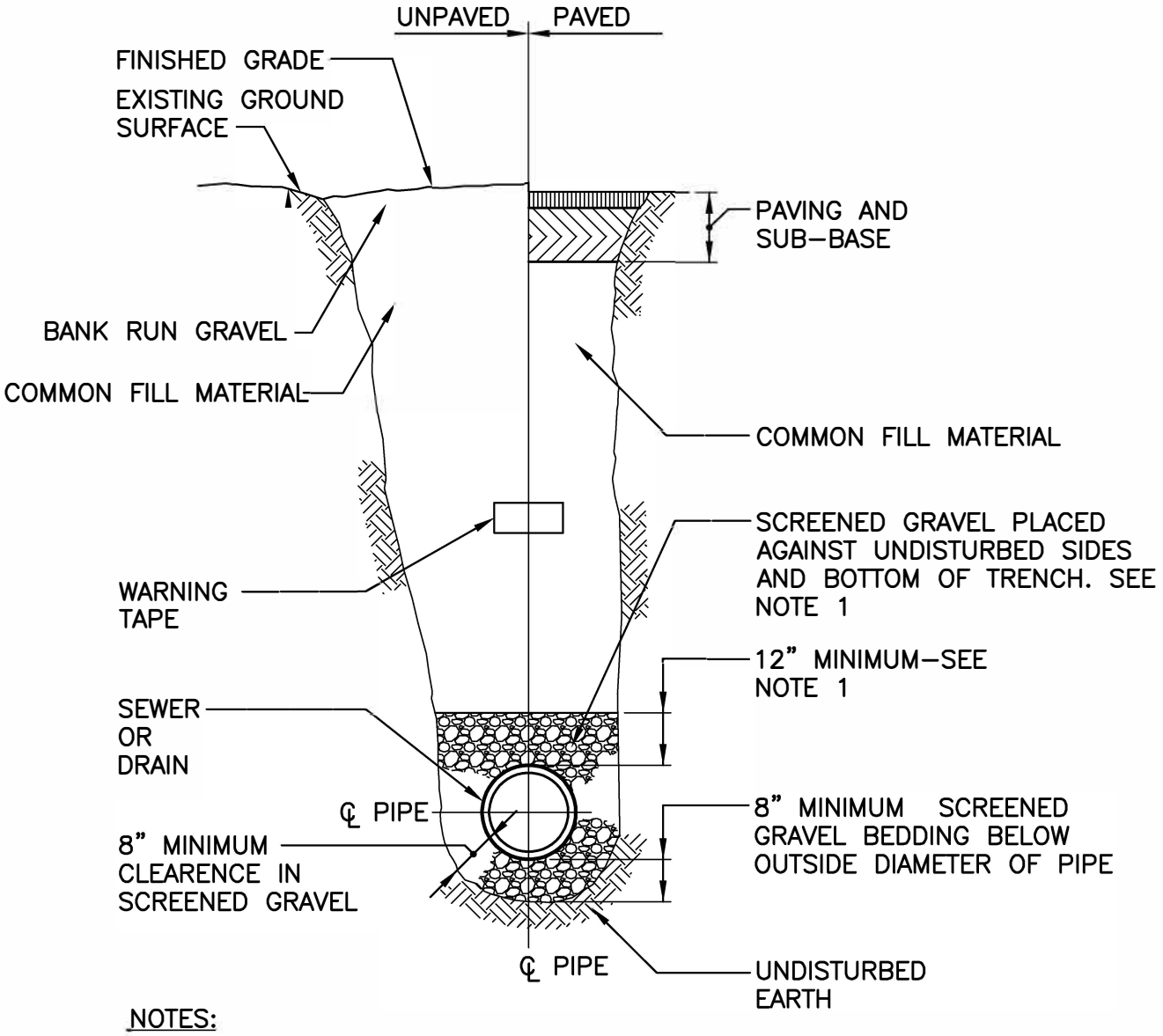


SECTION

FRAME AND COVER SETTING DETAIL

NTS

NOTE: THE CONTRACTOR SHALL REMOVE EXISTING FRAME, COVER AND RAISE MANHOLE FRAME AND COVER TO BE FLUSH WITH SURFACE.



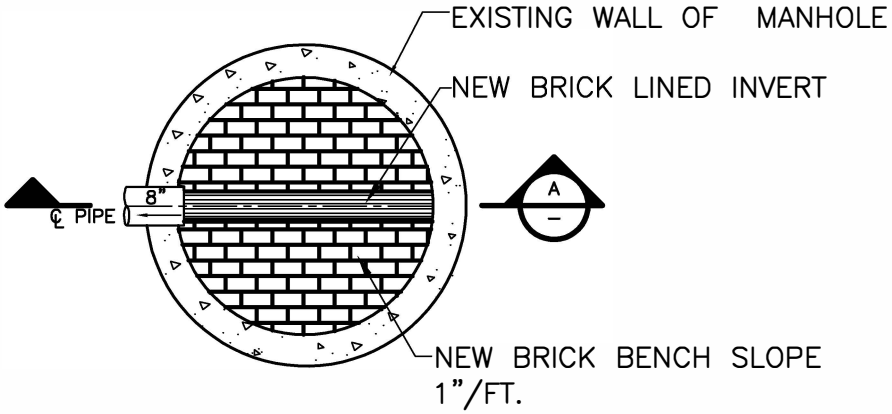
NOTES:

1. FOR PIPES OTHER THAN PVC, SELECT COMMON FILL MAY BE USED FROM MID–DIAMETER OF PIPE TO 12" ABOVE TOP OF PIPE.
2. TRENCHES LOCATED ON THE ROAD SHOULDER SHALL BE THE SAME AS IN STREET EXCEPT FOR PAVING.

TRENCH DETAIL FOR ALL GRAVITY PIPE

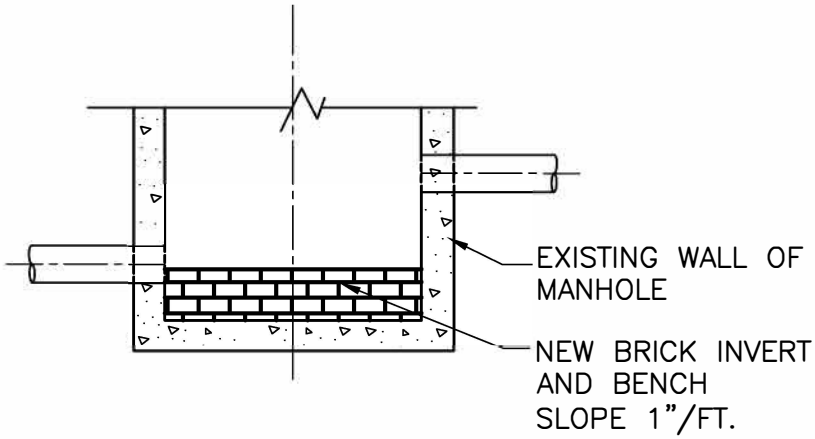
DETAIL

NTS



PLAN

NTS



CONSTRUCT NEW INVERT & BENCH

SECTION A

NTS

CITY OF PROVIDENCE, RHODE ISLAND

EMERGENCY ON-CALL
SEWER AND DRAINAGE REPAIRS
(BLANKET CONTRACT 2023-2025)

MISCELLANEOUS DETAILS

SHEET NO. 4