Updated 2/5/2026

FEDERAL PROJECT

Effective May 15, 2020
Supersedes April 22, 2020

BIDDING INSTRUCTIONS

FOR ALL PROJECTS:

1. Use pen and ink to complete all paper Bids.
2. As a minimum, the following must be received prior to the time of Bid opening:

For a Paper Bid:

a) a copy of the Notice to Contractors, b) the completed Acknowledgement of Bid Amendments form, c) the completed Schedule of Items, d) two copies of the completed and signed Contract Offer, Agreement & Award form, e) a Bid Guaranty, (if required), and f) any other certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

For an Electronic Bid:

NOTE: Not all projects accept Electronic Bids. Please review the Notice to Contractors and see if it specifically states that Electronic Bids will be accepted.

a) a completed Bid using Expedite® software and submitted via the Bid Express™ web-based service, b) an electronic Bid Guaranty (if required) or a faxed copy of a Bid Bond (with original to be delivered within 72 hours), and c) any other Certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

3. Include prices for all items in the Schedule of Items (excluding non-selected alternates).
4. Bid Guaranty acceptable forms are:
   a) a properly completed and signed Bid Bond on the Department's prescribed form (or on a form that does not contain any significant variations from the Department's form as determined by the Department) for 5% of the Bid Amount or
   b) an Official Bank Check, Cashier's Check, Certified Check, U.S. Postal Money Order or Negotiable Certificate of Deposit in the amount stated in the Notice to Contractors or
   c) an electronic bid bond submitted with an electronic bid.

5. If a paper Bid is to be sent, "FedEx First Overnight" delivery is suggested as the package is delivered directly to the DOT Headquarters Building located at 16 Child Street in Augusta. Other means, such as U.S. Postal Service's Express Mail has proven not to be reliable.

IN ADDITION, FOR FEDERAL AID PROJECTS:

6. Complete the DBE Proposed Utilization form, and submit with your bid. If you are submitting your bid electronically, you must FAX the form to (207) 624-3431. This is a curable defect.

If you need further information regarding Bid preparation, call the DOT Contracts Section at (207) 624-3410.

For complete bidding requirements, refer to Section 102 of the Maine Department of Transportation, Standard Specifications, March 2020 Edition.

February 5, 2026
Supersedes April 28, 2017

NOTICE

The Maine Department of Transportation is attempting to improve the way Bid Amendments/Addendums are handled and allow for an electronic downloading of bid packages from our website, while continuing to maintain an optional plan holders list.

Prospective bidders, subcontractors or suppliers who wish to download a copy of the bid package and receive a courtesy notification of project specific bid amendments must fill out the on-line plan holder registration form and provide an email address to the MDOT Contracts mailbox at: MDOT.contracts@maine.gov. Each bid package will require a separate request.

Additionally, interested parties will be responsible for reviewing and retrieving the Bid Amendments from our web site, and acknowledging receipt and incorporating those Bid Amendments in their bids using the Acknowledgement of Bid Amendment Form.

The downloading of bid packages from the MDOT website is not the same as providing an electronic bid to the Department. Electronic bids must be submitted via http://www.BIDX.com. For information on electronic bidding contact Guy Berthiaume at guy.berthiaume@maine.gov.

NOTICE

For security and other reasons, all Bid Packages which are mailed, shall be provided in double (one envelope inside the other) envelopes. The *Inner Envelope* shall have the following information provided on it:

Bid Enclosed - Do Not Open
PIN:
Town:
Date of Bid Opening:
Name of Contractor with mailing address and telephone number:

In Addition to the usual address information, the *Outer Envelope* should have written or typed on it:

Double Envelope: Bid Enclosed
PIN:
Town:
Date of Bid Opening:
Name of Contractor:
This should not be much of a change for those of you who use Federal Express or similar services.

Hand-carried Bids may be in one envelope as before, and should be marked with the following information:

Bid Enclosed: Do Not Open
PIN:
Town:
Name of Contractor:

STATE OF MAINE DEPARTMENT OF TRANSPORTATION

Bid Guaranty-Bid Bond Form

KNOW ALL MEN BY THESE PRESENTS THAT_____

_____, of the City/Town of_____and State of_____

as Principal, and_____as Surety, a

Corporation duly organized under the laws of the State of_____and having a usual place of

Business in_____and hereby held and firmly bound unto the Treasurer of

the State of Maine in the sum of_____,for payment which Principal and Surety bind

themselves, their heirs, executers, administrators, successors and assigns, jointly and severally.

The condition of this obligation is that the Principal has submitted to the Maine Department of Transportation, hereafter Department, a certain bid, attached hereto and incorporated as a part herein, to enter into a written contract for the construction of _____

_____

_____and if the Department shall accept said bid and the Principal shall execute and deliver a contract in the form attached hereto (properly completed in accordance with said bid) and shall furnish bonds for this faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be null and void; otherwise it shall remain in full force, and effect.

Signed and sealed this_____day of_____20_____

WITNESS:

_____

_____

_____

PRINCIPAL:

By_____

By:_____

By:_____

WITNESS

_____

_____

_____

SURETY:

By_____

By:_____

Name of Local Agency: _____

SAMPLE

NOTICE

Bidders:

Please use the attached "Request for Information" form when submitting questions concerning specific Contracts that have been advertised for Bid, include additional numbered pages as required. RFI's may be faxed to 207-624-3431, submitted electronically through the Departments web page of advertised projects by selecting the RFI tab on the project details page or via e-mail to RFI-Contracts.MDOT@maine.gov.

These are the only allowable mechanisms for answering Project specific questions. Maine DOT will not be bound to any answers to Project specific questions received during the Bidding phase through other processes.

When submitting RFIs by Email please follow the same guidelines as stated on the "Request for Information" form and include the word "RFI" along with the Project name and Identification number in the subject line.

State of Maine
Department of Transportation

RFI No: _____

REQUEST FOR INFORMATION

Date _____ Time _____

Information Requested for:

WIN(S): _____ Town(s):_____Bid Date: _____

Question(s):_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Request by:

Company Name:_____**Phone:(_____)**_____

Email:_____**Fax: (_____)**_____

Complete this form and fax to 207-624-3431, Attn: Project Manager (name listed on the "Notice to Contractors"), or Email questions to RFI-Contracts.MDOT@maine.gov, Please include the word "RFI" along with the Project Name and Identification Number in the Subject line, or electronically by using the RFI Tab located on the Individual Projects Detail page.

NOTICE

BIDDER'S LIST FORM

All Bidders must submit the Bidder's List Form with their bid.

The Bidder's List Form contains information required by USDOT.

The Bidder's List Form must be completed by each Prime Contractor.

A copy of the new Bidder's List Form and instructions for completing it are attached.

The DBE Directory can be found on the MaineDOT Website at: https://www.maine.gov/mdot/civilrights/dbe/

Questions about the Directory or this form should be sent to the Civil Rights Office at mary.bryant@maine.gov or by calling 207-624-3056.

Revised: 5/2025

INSTRUCTIONS FOR PREPARING THE MAINEDOT BIDDER'S LIST FORM

The Contractor shall extend equal opportunity to MaineDOT certified DBE firms (as listed in MaineDOT's DBE Directory of Certified Businesses) in the selection and utilization of subcontractors and suppliers.

Each prime contractor submitting a bid on a federally funded project must complete each section of the Bidder's List Form in its entirety for itself and each subcontractor on that project.

SPECIFIC INSTRUCTIONS FOR COMPLETING THE FORM:

Section A:

1. Insert Prime Contractor Name
2. Insert WIN for the Federal Project bidding on
3. Insert Bid Date
4. Insert Project Location
5. Insert Email address of Contact Person

Section B:

A. Enter each Contractor's and Sub-Contractor's name and address (including zip code) – Prime Contractor's name should be listed in first box of this section; then each additional line would be proposed subcontractors – DBE and NonDBE
B. Enter each Contractor's and Sub-Contractor's annual gross receipts bracket (see the legend on the form)
C. Enter DBE status (DBE or non-DBE) for each contractor/sub-contractor
D. Enter each Contractor's and Sub-Contractor's NAICS (North Amer. Industry Classification System) code (may be more than one) and Scope of Work
E. For each Contractor and Sub-Contractor enter the Race and Gender of the firm's majority owner
F. Enter the Age of each firm for every Contractor and Sub-Contractor
G. Enter the Proposed amount of payment (Bid amount) for each Contractor/Sub-Contractor.

Maine Department of Transportation

BIDDER'S LIST FORM

Section A. Bidder/Prime Contractor Information.
This section must be completed by the Bidder/Prime Contractor.

1. Prime Contractor Name:		2. Federal Project WIN:		3. Bid Date:	
4. Project Location:		5. Email Address:			

Section B. Commitment Details - Prime Contractor and all Proposed Subcontractor Information is Required in This Section

A. Firm's Name & Address, Including Zip Code Prime must be listed first	B. Annual Gross Receipt Bracket Select 1 to 7*	C. Status DBE or Non-DBE	D. NAICS Code(s) and Scope of Work	E. Race & Gender of each Firm's Majority Owner	F. Age of Each Firm	G. Proposed Amount

***1) Less Than $1M, 2) $1 - $3M, 3) $3 - $6M, 4) $6 - $10M, 5) $10 - $20M, 6) $20 - $50M, 7) Greater Than $50M - More than 5 Subs use a new form**

MaineDOT Use Only:
Form Received: ____/____/____ Verified by: _____

FHWA ☐ FTA ☐ FAA ☐

For a complete list of certified DBE firms please visit: http://www.maine.gov/dot/doing-business/civil-rights/dbe

Note: This information is required pursuant to 49 CFR §26.11 and is used to track data in all federally funded MaineDOT contracts.

DBE GOAL NOTICE

Maine Department of Transportation
Disadvantaged Business Enterprise Program

Notice is hereby given that in accordance with US DOT regulation 49 CFR Part 26, the Maine Department of Transportation (MaineDOT) has established a Disadvantaged Business Enterprise Program (DBE) for disadvantaged business participation in the federal-aid highway and bridge construction programs; MaineDOT contracts covered by the program include consulting, construction, supplies, manufacturing, and service contracts.

Beginning September 1, 2024, MaineDOT has established an annual DBE participation goal of **1.43%** to be achieved through race/gender neutral means. This goal has been approved by the Federal Highway Administration through August 31, 2027. MaineDOT must meet this goal each federal fiscal year. If the goal is not met, MaineDOT must provide a justification for not meeting the goal and provide a plan to ensure the goal is met, which may include contract goals on certain projects that contractors will be required to meet.

MaineDOT asks all contractors, consultants and subcontractors to seek certified DBE firms for projects and to work to meet the determined 1.43% goal without the need to impose contract goals. DBE firms are listed on the MaineDOT website at:

http://www.maine.gov/mdot/disadvantaged-business-enterprises/pdf/directory.pdf

Interested parties may view MaineDOT's DBE goal setting methodology, also posted on this website. If you have questions regarding this goal or the DBE program you may contact Sherry Tompkins at the Maine Department of Transportation, Civil Rights Office by telephone at (207) 624-3066 or by e-mail at: sherry.tompkins@maine.gov

Maine Department of Transportation Civil Rights Office

Directory of Certified Disadvantaged Business Enterprises

Listing can be found at:

https://www.maine.gov/mdot/civilrights/dbe/

For additional information and guidance contact:

Civil Rights Office at (207) 624-3056

It is the responsibility of the Contractor to access the DBE Directory at this site in order to have the most current listing.

Vendor Registration

Prospective Bidders must register as a vendor with the Department of Administrative & Financial Services if the vendor is awarded a contract. Vendors will not be able to receive payment without first being registered. Vendors/Contractors will find information and register through the following link –
http://www.maine.gov/purchases/venbid/index.shtml

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
NOTICE TO CONTRACTORS

Sealed Bids addressed to the Maine Department of Transportation, Augusta, Maine 04333 and endorsed on the wrapper "Bids for **Roadway Reconstruction with Intersection & Pedestrian Improvements, and Coastal Path Construction** in the city of **Portland"** will be received from contractors at the Reception Desk, MaineDOT Building, Capitol Street, Augusta, Maine, until 11:00 o'clock A.M. (prevailing time) on **April 29, 2026**, and at that time and place, publicly opened and read. Bids will be accepted from all bidders. The lowest responsive bidder must have completed, or successfully complete, a **Highway Construction, Paving**, or project specific prequalification to be considered for the award of this contract. **We now accept electronic bids for bid packages posted on the bidx.com website. Electronic bids do not have to be accompanied by paper bids. Please note: The Department will accept a facsimile of the bid bond; however, the original bid bond must then be received at the MDOT Contract Section within 72 hours of the bid opening. Until further notice, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence.**

Description: Maine Federal Aid Project No. 2894010 WIN 028940.10

Location: In Cumberland County, project is located on Sherwood Street, beginning 0.02 of a mile west of Veranda Street and extending 0.17 of a mile east. The coastal path is located at the end of Sherwood Street and the future location of the Roux Institute, east of Interstate 295.

Outline of Work: Roadway Reconstruction with Intersection & Pedestrian Improvements, and Coastal Path Construction and other incidental work.

For general information regarding Bidding and Contracting procedures, contact George Macdougall at (207) 624-3410. Our webpage at http://www.maine.gov/mdot/contractors/ contains a copy of the Schedule of Items, Plan Holders List, written portions of bid amendments, drawings, bid results and an electronic form for RFI submittal. For Project-specific information fax all questions to **Ernie Martin** at (207) 624-3431, use electronic RFI form or email questions to RFI-Contracts.MDOT@maine.gov, project name and identification number should be in the subject line. Questions received after 12:00 noon of Monday (or if that Monday is a state holiday, Friday) prior to bid date will not be answered. Bidders shall not contact any other Departmental staff for clarification of Contract provisions, and the Department will not be responsible for any interpretations so obtained. TTY users call Maine Relay 711.

Bid Documents, specifications and bid forms can be viewed and obtained digitally at no cost at http://www.maine.gov/mdot/contractors/ . They may be purchased from the Department between the hours of 7:00 a.m. to 3:30 p.m. by cash, credit card (Visa/Mastercard) or check payable to Treasurer, State of Maine sent to Maine Department of Transportation, Attn.: Mailroom, 24 Child Street, Augusta, Maine 04333-0016. They also may be purchased by telephone at (207) 624-3536 between the hours of 7:00 a.m. to 3:30 p.m. Full size plans **$100.00** (**$106.00** by mail). Half size plans **$50.00** (**$53.50** by mail), Bid Book $10 ($13 by mail), Single Sheets $2, payment in advance, all non-refundable.

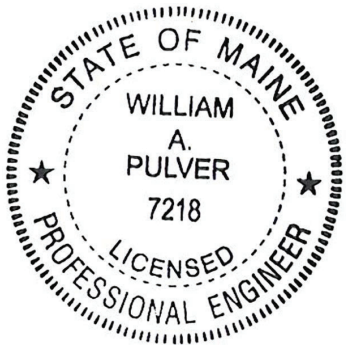
Each Bid must be made upon blank forms provided by the Department and must be accompanied by a bid bond at 5% of the bid amount or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the amount of 5% of the bid amount, payable to Treasurer, State of Maine as a Bid guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

This Contract is subject to all applicable Federal Laws. This contract is subject to compliance with the Disadvantaged Business Enterprise program requirements as set forth by the Maine Department of Transportation.

All work shall be governed *by State of Maine, Department of Transportation, Standard Specifications, March 2020 Edition,* price $10 [$15 by mail], and *Standard Details, March 2020 Edition*, price $10 [$15 by mail]. They also may be purchased by telephone at (207) 624-3536 between the hours of 7:00 a.m. to 3:30 p.m. *Standard Detail* updates can be found at http://www.maine.gov/mdot/contractors/publications/ .

The right is hereby reserved to the MaineDOT to reject any or all bids.

Augusta, Maine
April 8, 2026



WILLIAM A. PULVER P. E.
CHIEF ENGINEER

NOTICE

All bids for Federal Projects **shall** be accompanied by the DBE Proposed Utilization form. If you are submitting an electronic bid, the DBE Utilization Form may be faxed to 207-624-3431. Failure to submit the form with the bid will be considered a curable defect.

SPECIAL PROVISION 102.7.3
ACKNOWLEDGMENT OF BID AMENDMENTS

With this form, the Bidder acknowledges its responsibility to check for all Amendments to the Bid Package. For each Project under Advertisement, Amendments are located at http://www.maine.gov/mdot/contractors/ . It is the responsibility of the Bidder to determine if there are Amendments to the Project, to download them, to incorporate them into their Bid Package, and to reference the Amendment number and the date on the form below. The Maine DOT will not post Bid Amendments any later than noon the day before Bid opening without individually notifying all the planholders.

Amendment Number	Date

The Contractor, for itself, its successors and assigns, hereby acknowledges that it has received all of the above referenced Amendments to the Bid Package.

CONTRACTOR

Date

Signature of authorized representative

(Name and Title Printed)

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0010	201.23 REMOVING SINGLE TREE TOP ONLY	3.000 EA				
0020	201.24 REMOVING STUMP	3.000 EA				
0030	202.15 REMOVING EXISTING MANHOLE OR CATCH BASIN	3.000 EA				
0040	202.203 PAVEMENT BUTT JOINTS	70.000 SY				
0050	203.20 COMMON EXCAVATION	7,200.000 CY				
0060	203.2312 HEALTH AND SAFETY PLAN	 LUMP SUM	LUMP SUM			
0070	203.2333 DISPOSAL TREATMENT OF SPECIAL EXCAVATION GROUP 2	5,640.000 T				
0080	203.2333 DISPOSAL TREATMENT OF SPECIAL EXCAVATION GROUP 3	50.000 T				
0090	203.25 GRANULAR BORROW	590.000 CY				
0100	203.35 CRUSHED STONE 3/4 INCH	80.000 CY				
0110	206.082 STRUCTURAL EARTH EXCAVATION - MAJOR STRUCTURES	630.000 CY				
0120	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	2,800.000 CY				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0130	304.14 AGGREGATE BASE COURSE - TYPE A	790.000 CY				
0140	304.15 AGGREGATE BASE COURSE - TYPE B	1,100.000 CY				
0150	403.208 HOT MIX ASPHALT 12.5 MM HMA SURFACE	230.000 T				
0160	403.2081 12.5 MM POLYMER MODIFIED HOT MIX ASPHALT	300.000 T				
0170	403.209 HOT MIX ASPHALT 9.5 MM (SIDEWALKS, DRIVES, INCIDENTALS)	280.000 T				
0180	403.211 HOT MIX ASPHALT (SHIMMING)	130.000 T				
0190	403.213 HOT MIX ASPHALT 12.5 MM BASE	410.000 T				
0200	403.2131 12.5 MM POLYMER MODIFIED HMA BASE	390.000 T				
0210	409.15 BITUMINOUS TACK COAT - APPLIED	290.000 G				
0220	412.10 DECOMPOSED GRANITE PAVEMENT	60.000 SY				
0230	502.21 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS	150.000 CY				
0240	502.341 STRUCTURAL CONCRETE ROADWAY MEDIAN	2.000 CY				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0250	502.342 STRUCTURAL CONCRETE ROADWAY TRUCK APRON	10.000 CY				
0260	503.19 LOW-CARBON, CHROMIUM REINFORCEMENT - FABRICATED & DELIVERED	19,000.000 LB				
0270	503.20 LOW-CARBON, CHROMIUM REINFORCEMENT - PLACING	19,000.000 LB				
0280	511.07 COFFERDAM: JUST A COFFERDAM	LUMP SUM	LUMP SUM			
0290	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES	LUMP SUM	LUMP SUM			
0300	525.10 MONOLITHIC GRANITE BLOCKS	630.000 LF				
0310	525.11 MONOLITHIC GRANITE BLOCKS - SALVAGED MONOLITIC GRANITE BLOCKS SALVAGED	70.000 LF				
0320	602.30 FLOWABLE CONCRETE FILL	25.000 CY				
0330	603.155 12 INCH REINFORCED CONCRETE PIPE CLASS III	45.000 LF				
0340	603.199 24 INCH CULVERT PIPE OPTION III	16.000 LF				
0350	604.071 CATCH BASIN TYPE A1-P	3.250 EA				

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0360	604.091 CATCH BASIN TYPE B1-P	1.000 EA				
0370	604.18 ADJUSTING MANHOLE OR CATCH BASIN TO GRADE	35.000 EA				
0380	604.251 CATCH BASIN TYPE A5-P	4.250 EA				
0390	605.09 6 INCH UNDERDRAIN TYPE B	320.000 LF				
0400	605.11 12 INCH UNDERDRAIN TYPE C	510.000 LF				
0410	606.611 TIMBER GUARDRAIL	150.000 LF				
0420	607.163 CHAIN LINK FENCE - 4 FOOT P.V.C. COATED	740.000 LF				
0430	607.1701 TEMPORARY CHAIN LINK FENCE - 6' MOVEABLE	4,900.000 LF				
0440	607.25 REMOVE AND RESET CHAIN LINK FENCE	220.000 LF				
0450	608.07 PLAIN CONCRETE SIDEWALK	590.000 SY				
0460	608.08 REINFORCED CONCRETE SIDEWALK PEDESTRIAN	90.000 SY				
0470	608.08 REINFORCED CONCRETE SIDEWALK VEHICULAR	1,300.000 SY				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0480	608.26 CURB RAMP DETECTABLE WARNING FIELD	280.000 SF				
0490	608.272 GRANITE COBBLES WITH BITUMINOUS BASE GRANITE COBBLES WITH BITUMINOUS BASE	710.000 SY				
0500	608.282 GRANITE PAVERS WITH CONCRETE BASE	410.000 SY				
0510	609.11 VERTICAL CURB TYPE 1	1,213.000 LF				
0520	609.12 VERTICAL CURB TYPE 1 - CIRCULAR	190.000 LF				
0530	609.121 VERTICAL CURB TYPE 1 - GRANITE RADIUS CORNER	8.000 EA				
0540	609.221 TERMINAL CURB TYPE 1	140.000 LF				
0550	609.222 TERMINAL CURB TYPE 1 - CIRCULAR	134.000 LF				
0560	609.34 CURB TYPE 5	42.000 LF				
0570	609.341 CURB TYPE 5 - TRUCK APRON	43.000 LF				
0580	609.35 CURB TYPE 5 - CIRCULAR	28.000 LF				
0590	609.38 RESET CURB TYPE 1	50.000 LF				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0600	610.163 SPECIAL RIPRAP	920.000 CY				
0610	613.319 EROSION CONTROL BLANKET	130.000 SY				
0620	615.07 LOAM	80.000 CY				
0630	615.13 PLANTING BED SOIL	1,500.000 CY				
0640	615.14 HORTICULTURAL SUBSOIL	1,500.000 CY				
0650	615.15 LAWN SOIL	25.000 CY				
0660	615.16 FREE DRAINAGE SAND AND GRAVEL	55.000 CY				
0670	615.17 FLAT PANEL DRAIN	190.000 LF				
0680	616.08 SODDING	100.000 SY				
0690	618.13 SEEDING METHOD NUMBER 1	7.000 UN				
0700	618.231 TEMPORARY SEEDING OVERSEEDING - TYPE A TEMPORARY SEEDING OVERSEEDING - TYPE A	5.000 UN				
0710	618.232 TEMPORARY SEEDING OVERSEEDING - TYPE B TEMPORARY SEEDING OVERSEEDING - TYPE B	8.000 UN				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0720	619.12 MULCH	7.000 UN				
0730	619.14 EROSION CONTROL MIX	200.000 CY				
0740	619.142 SPECIAL MULCH - PLANTING MIX	80.000 CY				
0750	619.143 SPECIAL MULCH - LEAF LITTER	35.000 CY				
0760	620.54 STABILIZATION/REINFORCEMENT GEOTEXTILE	1,300.000 SY				
0770	620.58 EROSION CONTROL GEOTEXTILE	1,500.000 SY				
0780	621.026 EVERGREEN TREES (3 FOOT - 4 FOOT) GROUP B	2.000 EA				
0790	621.037 EVERGREEN TREES (5 FOOT - 6 FOOT) GROUP A	24.000 EA				
0800	621.046 EVERGREEN TR (8' - 10') GP A	1.000 EA				
0810	621.047 EVERGREEN TREES (8 FOOT - 9 FOOT) GROUP B	1.000 EA				
0820	621.054 EVERGREEN TREES (10 FOOT - 12 FOOT) GROUP C	4.000 EA				
0830	621.121 SMALL DECIDUOUS TREES (5 FOOT - 6 FOOT) GROUP B	1.000 EA				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0840	621.138 SMALL DECIDUOUS TREE (1.50 INCH - 2 INCH CALIPER) GROUP A	7.000 EA				
0850	621.2021 MEDIUM DECIDUOUS TREE (2.5 INCH - 3 INCH CALIPER) GROUP B	3.000 EA				
0860	621.28 LARGE DECIDUOUS TREE (2.50 INCH - 3 INCH CALIPER) GROUP B	6.000 EA				
0870	621.281 LARGE DECIDUOUS TREE (2.50 INCH - 3 INCH CALIPER) GROUP C	3.000 EA				
0880	621.285 LARGE DECIDUOUS TREE (3 INCH - 3.50 INCH CALIPER) GROUP A	5.000 EA				
0890	621.286 LARGE DECIDUOUS TREE (3 INCH - 3.50 INCH CALIPER) GROUP B	3.000 EA				
0900	621.287 LARGE DECIDUOUS TREE (3 INCH - 3.50 INCH CALIPER) GROUP C	16.000 EA				
0910	621.291 LARGE DECIDUOUS TREE (3.50 INCH - 4 INCH CALIPER) GROUP A	7.000 EA				
0920	621.293 LARGE DECIDUOUS TREE (3.50 INCH - 4 INCH CALIPER) GROUP C	1.000 EA				
0930	621.389 EVERGREENS (15 INCH - 18 INCH) GROUP A	129.000 EA				
0940	621.478 BRDLF EVERGREENS (6" - 12") GP A	101.000 EA				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0950	621.546 DECIDUOUS SHRUBS (2 FOOT - 3 FOOT) GROUP A	101.000 EA				
0960	621.547 DECIDUOUS SHRUBS (2 FOOT - 3 FOOT) GROUP B	10.000 EA				
0970	621.548 DECIDUOUS SHRUBS (2 FOOT - 3 FOOT) GROUP C	43.000 EA				
0980	621.552 DECIDUOUS SHRUBS (3 FOOT - 4 FOOT) GROUP A	42.000 EA				
0990	621.553 DECIDUOUS SHRUBS (3 FOOT - 4 FOOT) GROUP B	8.000 EA				
1000	621.558 DECIDUOUS SHRUBS (4 FOOT - 5 FOOT) GROUP A	93.000 EA				
1010	621.559 DECIDUOUS SHRUBS (4 FOOT - 5 FOOT) GROUP B	16.000 EA				
1020	621.56 DECIDUOUS SHRUBS (4 FOOT - 5 FOOT) GROUP C	89.000 EA				
1030	621.66 VINES (18 INCH - 24 INCH) GROUP A	30.000 EA				
1040	621.703 HERBACEOUS PLANT PLUG 2 INCH POT	3,893.000 EA				
1050	621.7091 HERBACEOUS PERENNIALS/ GRASSES 4” PLUGS HERBACEOUS PERENNIALS/GRASSES 4? PLUGS	17,290.000 EA				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
1060	621.71 HERBACEOUS PERENNIALS GROUP A	195.000 EA				
1070	621.711 HERBACEOUS PERENNIALS GROUP B	88.000 EA				
1080	621.712 HERBACEOUS PERENNIALS GROUP C	735.000 EA				
1090	621.981 PLASTIC LANDSCAPE EDGING	20.000 LF				
1100	621.982 METAL LANDSCAPE EDGING - ALUMINUM PAVER RESTRAIN METAL LANDSCAPE EDGING - ALUMINUM PAVER RESTRAIN	730.000 LF				
1110	623.09 REMOVE AND RESET MONUMENT	1.000 EA				
1120	626.11 PRECAST CONCRETE JUNCTION BOX	4.000 EA				
1130	626.22 NON-METALLIC CONDUIT	1,170.000 LF				
1140	626.251 NON-METALLIC UNDER PAVEMENT CONDUIT (SCHEDULE 80 OR GREATER RATING)	100.000 LF				
1150	626.421 24 INCH DIAMETER FOUNDATION	77.000 LF				
1160	627.733 4" WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE	1,650.000 LF				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
1170	627.75 WHITE OR YELLOW PAVEMENT & CURB MARKING	1,100.000 SF				
1180	627.78 TEMPORARY 4 INCH PAINTED PAVEMENT MARKING LINE, WHITE OR YELLOW	1,650.000 LF				
1190	629.05 HAND LABOR, STRAIGHT TIME	70.000 HR				
1200	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	120.000 HR				
1210	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	120.000 HR				
1220	634.041 LUMINAIRES (WALL MOUNTED)	2.000 EA				
1230	634.160 HIGHWAY LIGHTING	LUMP SUM	LUMP SUM			
1240	634.2042 LED LUMINARIES E01A	28.000 EA				
1250	634.2042 LED LUMINARIES E01C	5.000 EA				
1260	634.2042 LED LUMINARIES E02C	5.000 EA				
1270	634.2042 LED LUMINARIES E02D	4.000 EA				
1280	634.2042 LED LUMINARIES GUIDWAY SERIES	7.000 EA				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1290	634.210 CONVENTIONAL LIGHT STANDARD	49.000 EA				
1300	634.70 ORNAMENTAL LIGHTING LANDSCAPE FLOODLIGHT	6.000 EA				
1310	634.70 ORNAMENTAL LIGHTING UNDER HANDRAIL	6.000 EA				
1320	634.702 ORNAMENTAL LIGHTING - LED FLEXIBLE STRIP ORNAMENTAL LIGHTING - LED FLEXIBLE STRIP	260.000 LF				
1330	639.18 FIELD OFFICE TYPE A	1.000 EA				
1340	645.106 DEMOUNT REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	13.000 EA				
1350	645.116 REINSTALL REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	8.000 EA				
1360	645.271 REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGNS, TYPE I	120.000 SF				
1370	652.33 DRUM	50.000 EA				
1380	652.34 CONE	100.000 EA				
1390	652.35 CONSTRUCTION SIGNS	430.000 SF				

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
1400	652.361 MAINTENANCE OF TRAFFIC CONTROL DEVICES	LUMP SUM	LUMP SUM			
1410	652.38 FLAGGER	9,260.000 HR				
1420	652.41 PORTABLE CHANGEABLE MESSAGE SIGN	2.000 EA				
1430	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP SUM	LUMP SUM			
1440	658.20 ACRYLIC LATEX COLOR FINISH, GREEN	60.000 SY				
1450	659.10 MOBILIZATION	LUMP SUM	LUMP SUM			
1460	801.071 TEMPORARY SEWER BY-PASS	LUMP SUM	LUMP SUM			
1470	801.17 8 INCH PVC SANITARY SEWER (SDR-35)	10.000 LF				
1480	801.175 10 INCH PVC SANITARY SEWER	20.000 LF				
1490	801.184 12 INCH PVC SANITARY SEWER (SDR-23) 12" PVC SANITARY SEWER (SDR-21)	15.000 LF				
1500	801.19 15 INCH PVC SANITARY SEWER (SDR-35)	380.000 LF				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1510	801.191 15" PVC SANITARY SEWER (SDR-21)	420.000 LF				
1520	802.10 12 INCH DUCTILE IRON WATERMAIN	710.000 LF				
1530	802.168 12" MJ SOLID SLEEVE	2.000 EA				
1540	803.011 TEST PITS	12.000 CY				
1550	803.172 SEWER MANHOLE - 5 FOOT DIAMETER BASE SECTION	1.000 EA				
1560	803.1721 5 FT. DIA. MANHOLE BARREL SECTION	17.000 VF				
1570	803.173 SEWER MANHOLE - 4 FOOT DIAMETER BASE SECTION	5.000 EA				
1580	803.1732 SEWER MANHOLE - 4 FOOT DIAMETER BARREL SECTION	65.000 VF				
1590	803.18 STANDARD SEWER FRAMES AND COVER	6.000 EA				
1600	803.181 REMOVE/ ABANDON MANHOLE	3.000 EA				
1610	812.162 ADJUSTING SEWER MANHOLE TO GRADE	4.000 EA				
1620	815.40 CAST IN PLACE OR PRECAST CONCRETE SEATWALLS	84.000 LF				

Proposal ID: 028940.10 **Project(s):** 028940.10

SECTION: 1 HIGHWAY

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
1630	815.41 TERRACED LANDSCAPE	LUMP SUM	LUMP SUM			
1640	823.31 12 INCH GATE VALVE	1.000 EA				
1650	823.3104 12" INSERTION VALVE	1.000 EA				
1660	824.3010 HYDRANT ASSEMBLY	1.000 EA				
1670	825.333 1" AIR RELEASE VALVE	1.000 EA				
1680	825.334 1" COPPER SERVICE - LONGSIDE	2.000 EA				
1690	825.335 1" COPPER SERVICE - SHORTSIDE	1.000 EA				
1700	825.4313 1.5" Copper Service - Longside	1.000 EA				
1710	825.5411 TEMPORARY WATER MAIN	LUMP SUM	LUMP SUM			
1720	825.55 2 " WATER SERVICE - RECONNECT	1.000 EA				
1730	827.3641 REMOVE AND DISPOSE ASBESTOS CEMENT PIPE	280.000 LF				
1740	890.06 BUS SHELTER	LUMP SUM	LUMP SUM			
1750	890.07 BIKE RACKS	48.000 EA				

Section: 1 **Total:** _____

Total Bid: _____

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and

_____

a corporation or other legal entity organized under the laws of the State of _____, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, **WIN 028940.10** for **Roadway Reconstruction with Intersection & Pedestrian Improvements, and Coastal Path Construction** in the city of **Portland**, County of **Cumberland, Maine**. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work; performing construction quality control including inspection, testing and documentation; providing all required documentation at the conclusion of the project; warrantying its work; and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract. Payment shall be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **October 29, 2027.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the *State of Maine Department of Transportation Standard Specifications, March 2020 Edition* and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

_____

$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in the Federal Contract Provisions Supplement, and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, *Standard Specifications March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

WIN 028940.10 - Roadway Reconstruction with Intersection & Pedestrian Improvements, and Coastal Path Construction - in the city of Portland

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items."

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items," which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the *Standard Specifications, March 2020 Edition*, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the *Standard Specifications March 2020 Edition* and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: Dale F. Doughty, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and

_____

a corporation or other legal entity organized under the laws of the State of _____, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, **WIN 028940.10** for **Roadway Reconstruction with Intersection & Pedestrian Improvements, and Coastal Path Construction** in the city of **Portland**, County of **Cumberland, Maine**. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work; performing construction quality control including inspection, testing and documentation; providing all required documentation at the conclusion of the project; warrantying its work; and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract. Payment shall be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **October 29, 2027.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the *State of Maine Department of Transportation Standard Specifications, March 2020 Edition* and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

_____

$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in the Federal Contract Provisions Supplement, and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, *Standard Specifications March 2020 Edition, Standard Details March 2020 Edition* as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

WIN 028940.10 - Roadway Reconstruction with Intersection & Pedestrian Improvements, and Coastal Path Construction - in the city of Portland

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items."

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items," which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the *Standard Specifications, March 2020 Edition*, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the *Standard Specifications March 2020 Edition* and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: Dale F. Doughty, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and **(Name of the firm bidding the job)** a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at **(address of the firm bidding the job)**

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

SAMPLE

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No.01**12345.00**, for the **Hot Mix Asphalt Overlay** in the town/city of **South Nowhere,** County of **Washington**, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **November 15, 2006.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the *State of Maine Department of Transportation Standard Specifications, March 2020 Edition* and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is **(Place bid here in alphabetical form such as One Hundred and Two dollars and 10 cents)** **$ (repeat bid here in numerical terms, such as $102.10)** Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition*, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the *Standard Specifications March 2020 Edition* (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

SAMPLE

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, *Standard Specifications, March 2020 Edition, Standard Details March 2020 Edition*, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN 012345.00 South Nowhere, Hot Mix Asphalt Overlay ,

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items."

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

SAMPLE

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items," which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the *Standard Specifications, March 2020 Edition*, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the *Standard Specifications March 2020 Edition* and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

	(Sign Here)
Date	(Signature of Legally Authorized Representative of the Contractor)
(Witness Sign Here)	**(Print Name Here)**
Witness	(Name and Title Printed)

SAMPLE

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

Date	By: Dale F. Doughty, Commissioner
(Witness)	

BOND # _____

CONTRACT PERFORMANCE BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the State of** _____, as principal, and…….....,
a corporation duly organized under the laws of the State of ..... and having a usual place of business ....,
as Surety, are held and firmly bound unto the Treasurer of the State of Maine in the sum of _____ **and 00/100 Dollars ($),** to be paid said Treasurer of the State of Maine or his successors in office, for which payment well and truly to be made, Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the Contract to construct Project Number _____ in the Municipality of _____ promptly and faithfully performs the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the State of Maine.

Signed and sealed this ..... day of ....., 20….. .

WITNESSES:	SIGNATURES: CONTRACTOR:
Signature.....	.....….....
Print Name Legibly	Print Name Legibly ...……..... SURETY:
Signature	....……..... Print Name Legibly .....
Print Name Legibly	
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
.....	ADDRESS .....
.....	...……..... .....…….....
.....	
TELEPHONE.....	.....…….....

SAMPLE

BOND # _____

CONTRACT PAYMENT BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the State of** _____, as principal, and.....…..... a corporation duly organized under the laws of the State of ..... and having a usual place of business in .....……., as Surety, are held and firmly bound unto the Treasurer of the State of Maine for the use and benefit of claimants as herein below defined, in the sum of _____ **and 00/100 Dollars ($)** for the payment whereof Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the Contract to construct Project Number _____ in the Municipality of _____ promptly satisfies all claims and demands incurred for all labor and material, used or required by him in connection with the work contemplated by said Contract, and fully reimburses the obligee for all outlay and expense which the obligee may incur in making good any default of said Principal, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the contract.

Signed and sealed this ..... day of ...…….....…., 20 ... .

WITNESS:	SIGNATURES:
	CONTRACTOR:
Signature…….....	.....….....
Print Name Legibly .....……..	Print Name Legibly ….....….....
	SURETY:
Signature.....	...….....….....
Print Name Legibly	Print Name Legibly ….....….....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
...….....….....	ADDRESS ….....….....
.....….....	…….....….....
TELEPHONE	…….....….....

SAMPLE

"General Decision Number: ME20260046 01/02/2026

Superseded General Decision Number: ME20250046

State: Maine

Construction Type: Highway

County: Cumberland County in Maine.

HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	01/02/2026

SUME2014-041 06/23/2017

	Rates	Fringes
CARPENTER, Includes Form Work	$ 18.95	3.23
CEMENT MASON/CONCRETE FINISHER	$ 19.27	1.13
ELECTRICIAN	$ 26.40	6.66
HIGHWAY/PARKING LOT STRIPING: Laborer	$ 15.53	2.04
INSTALLER - GUARDRAIL	$ 19.98	2.55
IRONWORKER, REINFORCING	$ 21.85	0.00
IRONWORKER, STRUCTURAL	$ 22.33	4.50
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 17.44	2.07
LABORER: Common or General	$ 15.29	2.08
LABORER: Epoxy Injector (Concrete)	$ 13.43	1.15
LABORER: Wheelman	$ 20.34	3.43

OPERATOR:
Backhoe/Excavator/Trackhoe.....$ 21.07 4.39

OPERATOR: Bobcat/Skid
Steer/Skid Loader.....$ 21.97 1.74

OPERATOR: Broom/Sweeper.....$ 19.02 0.00

OPERATOR: Bulldozer.....$ 21.71 5.67

OPERATOR: Grader/Blade.....$ 27.40 8.13

OPERATOR: Loader.....$ 19.95 2.86

OPERATOR: Mechanic.....$ 24.69 8.18

OPERATOR: Milling Machine.....$ 28.51 5.44

OPERATOR: Paver (Asphalt,
Aggregate, and Concrete).....$ 19.98 4.95

OPERATOR: Roller (Earth).....$ 18.57 2.50

OPERATOR: Roller Asphalt.....$ 19.30 4.09

TRAFFIC CONTROL: Flagger.....$ 9.00 0.00

TRAFFIC CONTROL:
Laborer-Cones/
Barricades/Barrels -
Setter/Mover/Sweeper.....$ 17.02 5.37

TRUCK DRIVER: Dump Truck.....$ 16.71 2.80

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at

https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at

www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based.

The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

December 17, 2010
Supersedes December 30, 2009

SPECIAL PROVISION
SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES
(Electronic Payroll Submission)
(Payment Tracking)

104.3.8.1 Electronic Payroll Submission The prime contractor and all subcontractors and lower-tier subcontractors will submit their certified payrolls electronically on this contract utilizing the Elation System web based reporting. There is no charge to the contracting community for the use of this service. The submission of paper payrolls will not be allowed or accepted. Additional information can be found at http://www.maine.gov/mdot/contractors/ under the first "Notice".

104.3.8.2 Payment Tracking The prime contractor and all subcontractors and lower-tier subcontractors will track and confirm the delivery and receipt of all payments through the Elation System

SPECIAL PROVISION
SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES
(Cooperation with Other Contractors)

It is hereby brought to the Contractor's attention that the Department is allowing work to be performed near the Project Limits of this Contract, which will be in progress simultaneously. Consigli Construction will be working on the property of Northeastern University to construct the proposed Roux Institute campus.

A temporary movable fence shall be installed to define the Project's construction limits. See Exhibit B for more information. There is scoped shared between MaineDOT and Northeastern on either side of the fence line.

The Contractor shall cooperate with other contractors at all times and provide project access as necessary and as directed by the Resident.

Town: **Portland**
Project: **28940.10**
Date: **March 31, 2026**

SPECIAL PROVISIONS
SECTION 104
Utilities

UTILITY COORDINATION

The Contractor has primary responsibility for coordinating their work with utilities after Contract award. The Contractor shall communicate directly with the utilities regarding any utility work necessary to maintain the Contractor's schedule and prevent project construction delays. The Contractor shall notify the Resident of any issues.

THE CONTRACTOR SHALL PLAN AND CONDUCT WORK ACCORDINGLY.

MEETING

A Preconstruction Utility Conference, as defined in Subsection 104.4.6 of the Standard Specifications **is** required.

GENERAL INFORMATION

These Special Provisions outline the arrangements that have been made by the Department for utility and/or railroad work to be undertaken in conjunction with this project. The following list identifies all known utilities or railroads having facilities presently located within the limits of this project or intending to install facilities during project construction.

Utilities have been notified and will be furnished a project specification.

Overview:

Utility/Railroad	Aerial	Underground	Contact	Phone
Central Maine Power	X	X	Mark Buxton	(207) 233-6477
Charter Communication	X	X	Mark Pelletier	(207) 253-2324
Consolidated Communications	X	X	Marty Pease	(207) 272-7993
GoNetSpeed	X		Jim Knight	(207) 590-5111
City of Portland Fire Department		X	Jon Belanger	(207) 874-8400 (207) 653-2450
City of Portland, Water Resources		X	Justin Pellerin	(207) 745-3939
City of Portland, Sewer		X	Dale Wermenchuk	(207) 756-8347
Portland Water District, Water		X	Robert Bartels	(207) 774-5961
Portland Water District, Sewer		X	Robert Bartels	(207) 774-5961
Unitil Corporation		X	Mike Rodney	(207) 632-3132
Consigli Construction (on behalf of Northeastern University)		X	Parker Lamarre	(774) 217-9699

Temporary utility adjustments **are not** anticipated beyond those included in the Contract. If any unexpected utility relocations become necessary, they shall be scheduled in accordance with Section 104 of the Standard Specifications and shall be performed by the appropriate utility company in conjunction with the work by the Contractor. Should the Contractor choose to have any poles temporarily relocated, all work shall be done at the Contractor's request and expense, with no additional cost or schedule impacts to the Department.

Unless otherwise specified, any underground utility facilities shown on the project plans represent approximate locations gathered from available information. The Department cannot certify the level of accuracy of this data. Underground facilities indicated on the topographic sheets (plan views) have been collected from historical records and/or on-site designations provided by the respective utility companies. Underground facilities indicated on the cross-sections have been carried over from the plan view data and may also include further approximations of the elevations (depths) based upon straight-line interpolation from the nearest manholes, gate valves, or test pits.

All adjustments are to be made by the respective utility/railroad unless otherwise specified herein.

Fire hydrants shall not be disturbed until all necessary work has been accomplished to provide proper fire protection.

All clearing and tree removal in areas where utilities are involved must be completed before the utilities are able to relocate their facilities.

It is the responsibility of the Contractor with the Utility Pole owner, to layout all of the proposed pole locations in the field prior to the start of utility relocations. Should any adjustments be needed, the Utility will document adjustments and inform the Department prior to utility relocations.

The Contractor shall provide the utilities access to the new pole locations. Construction of any spot cuts or fills in excess of 2 feet must be completed prior to utility relocations. The Contractor shall prepare a plan for how access and the spot cuts and fills will be accomplished and what the schedule will be for performing the work. This plan will be discussed at the pre-construction utility meeting.

***** Specific information regarding the line voltage can be requested from* Central Maine Power Co.****

Utility working days are Monday through Friday. Times are estimated on the basis of a single crew for each utility. Any times and dates mentioned are **estimates only** and are dependent upon favorable weather, working conditions, and freedom from emergencies. The Contractor shall have no claim against the Department if they are exceeded.

Note that both AIS and Buy America certifications will be collected for the project files. The AIS certifications will be collected to satisfy the AIS funding agency requirements and documents while Build America, Buy America (BABA) certifications will be collected to satisfy FHWA project requirements.

This Contract is subject to the requirements of Buy America in accordance with Federal Regulation 23 CFR 635.410 Section 1518. Specific requirements are presented in MaineDOT Standard Specification Section 100, Appendix A, Section 3.A., Buy America which are incorporated and made a part hereof by reference.

This Contract is also subject to the Requirements of Build America, Buy American (BABA) as defined in The Infrastructure Investment and Jobs Act (IIJA), Public Law No. 117-58. The Office of Management and Budget issued memorandum M-22-11 to provide guidance on the law which can be found here:

https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf

Build America, Buy America (BABA) which are incorporated and made a part hereof by reference.

AERIAL

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Central Maine Power	3		3	7	8
Charter Communication			3		3
GoNetSpeed			3		3
Consolidated Communications			3		3
				Total:	17

Utility Specific Issues:

Central Maine Power
Central Maine Power has lines that run the length of Sherwood Street (West to East, South side) to CMP Pole #5, then run underground to cross the I-295 overpass to an existing manhole, then northerly across Sherwood Street underground to CMP Pole #4 that was set in conjunction with the Roux Institute Campus construction.

For the construction on Sherwood Street, approximately **3 poles** (two transmission poles and one service pole) will be relocated. A guy pole on the north side of Sherwood Street will be eliminated and removed. Once CMP has transferred power to the new poles, Charter, GoNetSpeed, and Consolidated shall be contacted by the Contractor of CMP to notify that the next transfers can begin. After transfers are complete, CMP shall remove the poles that are no longer in service per the pole list below.

Charter Communication
Charter Communication has an existing line that runs the length of Sherwood Street (West to East, South Side) to Pole #5, then runs underground to cross the I-295 overpass to an existing manhole, then northerly across Sherwood Street underground to old CMP Pole #4, where it feeds Kensington Street.

There is also a duct bank coming from the future site of the Roux campus that will eventually tie directly into the existing manhole.

For the construction of Sherwood Street, Charter will have approximately 4 transfers to complete once the pole moves are done, including transfers on both sides of the I295 overpass. Once Charter's transfers are completed, the Contractor shall contact GoNetSpeed to continue with transfers.

GoNetSpeed
GoNetSpeed has aerial lines on Sherwood Street west of I295 that will need to be transferred once the poles have been relocated. Once GoNetSpeed's transfers are completed, the Contractor shall contact Consolidated to continue with transfers.

Consolidated Communications
Consolidated has an underground duct bank with a riser at Pole #6. The line provides services west of I295 and then returns. The duct bank will need to be altered once Pole #6 is moved and transfers on Sherwood Street will be required onto the new pole locations.

Pole List:

Existing Pole #	Existing Station	Left/Right		Existing Offset	Proposed Station	Left/Right		Proposed Offset	Comments
		LT	RT			LT	RT		
Sherwood Street									
CMP 5	209+78.13		X	22.8'					Veranda Street
CMP 6	210+21.88	X		89.0'					Veranda Street
CMP #6	211+32.02		X	9.1'	**211+32.00**		**X**	**11.50**	
CMP #6S	211+36.89	X		27.7'					**Remove**
CMP #5.1/5D	213+06.82	X		18.9'	**213+11.00**	**X**		**13.50**	
	213+47.74		X	18.3'					**Remove**
CMP #5	213+47.82		X	15.8'	**213+48.00**		**X**	**18.50**	
CMP #4	215+22.24	X		17.8'					**Remove**
CMP #4S	215+22.38		X	20.6'					**Remove**
CMP #4 (new)	215+51.77	X		28.1'					Recent installation
CMP #3	215+71.77	X		28.1'					Recent installation
CMP #2	215+91.77	X		28.1'					Recent installation
CMP #1	216+28.54	X		28.1'					Recent installation
CMP 6	400+70.63	X		15.4'					Sherwood Street, west of Veranda

SUBSURFACE

Summary:

Utility	Summary of Work	Estimated Working Days
Central Maine Power	Adjust the existing electrical manhole to grade	1
Charter Communication	Connect duct bank from campus site to existing manhole	2
Consolidated Communications	Move Riser at Pole #6 Station 211+32. Adjust manhole at Station 300+82	2
City of Portland Fire Department		
Unitil Corporation	Lower, then raise shut-off valve at Sta 210+36 Raise shut-off valve at Station 400+62	3
Unitil Corporation	Discharge and abandon an unused gas line.	5
City of Portland, Water Resources	Storm drain replacement along Sherwood Street and manhole adjustments along the Coastal Path (by Contractor)	
City of Portland, Sewer	Adjust four (4) sewer manholes on Sherwood and Veranda Streets (by Contractor)	
Portland Water District, Water	Adjust four (4) water gates in the raised intersection of Sherwood and Veranda. Install a new Hydrant assembly, including removal of the original (by Contractor). Replace the watermain on Sherwood (by Contractor).	1
Portland Water District, Water	Relocate the sewer interceptor (by Contractor)	
	Total:	14

Utility Specific Issues:

Central Maine Power
Central Maine Power has underground conduit from Pole #5 to an electrical manhole that runs under the I295 overpass. There should not be any need for work on that line. CMP intends to adjust the manhole to finish grade and estimates **1 working day to complete the adjustment**. The Contractor shall provide **two weeks notification** to CMP for any and all work to be performed by CMP.

Charter Communication
An existing duct bank from the Northeastern campus will be extended to the existing utility manhole. Charter Communications intends to extend the duct bank and estimates **2 working days to complete the extension**. The Contractor shall provide **two weeks notification** to Charter Communications for any and all work to be performed by Charter Communications.

Consolidated Communications
Consolidated Communications Inc. has an underground duct bank with a riser at Pole #6. The duct bank will need to be altered once Pole #6 is moved. CCI intends to alter the duct bank and estimates **1 working day to complete the alteration**. The Contractor shall provide **two weeks notification** to CCI for any and all work to be performed by CCI.

CCI has a utility manhole on Veranda Street that lies within the raised intersection area that will need to be raised to meet the proposed pavement surface. Consolidated intends to adjust the manhole to finish grade and estimates **1 working day to complete the adjustment**. The Contractor shall provide **two weeks notification** to CCI prior to the work taking place.

Unitil Corporation
A 2" polyethylene gas main serves Sherwood Street with service lines feeding the buildings. A shut-off valve near the intersection of Veranda Street (Station 311+32) will need to be lowered during construction, then raised to match the proposed pavement surface. Another shut-off valve on the western branch of Sherwood Street (Station 400+62) will need to be raised to meet the proposed pavement surface of the raised intersection. Requests shall be made by submitting a Valve Box Request Form to Coastal Road Repair at vbrequest@crrme.com. Unitil estimates **1 working day for each adjustment**. Allow **5 business days** for each request to be completed.

Unitil owns an existing gas branch line, that is not in use, that runs from their main line on the west side of I295, under I295, then runs parallel to the existing off-ramp and dead ends near the edge of the Roux institute campus construction site (approximate Station 7+25). The line will be cut, purged, capped and abandoned by Unitil. The cut location will occur outside the project limits; the work to purge the pipe will occur within the footprint of the coastal path. Unless authorized otherwise, this work will be completed in July, 2026, after the access restrictions for the parking garage construction are lifted, and prior to the commencement of the construction of the proposed PWD sewer main.

City of Portland Fire Department
Within the project limits of the Sherwood Street construction are underground Fire Department facilities that have been abandoned. If the existing structures interfere with the work, contact Jon Belanger for coordination. **Impacts are not anticipated.**

City of Portland, Water Resources
The existing outfall for stormwater is a newly constructed 24" pipe that was installed with the construction of the Roux campus. All surface drainage and underdrains will tie into this outfall. This work will be conducted by the Contractor. The City of Portland requests **2 weeks' notification** prior to work taking place as they may elect to have an on-site representative for inspection purposes.

City of Portland, Sewer

The City of Portland has approximately **four (4) sewer manholes** to adjust to grade. The City of Portland has entered into an agreement with the Maine Department of Transportation to include items for adjusting the manholes in the project contract. The work shall be completed in accordance with Special Provisions for Item 812.162. The Contractor shall adjust the utility manholes as part of the Contract and shall include adjustment of the utility manholes in the schedule for construction. The City of Portland requests **two weeks' notification** prior to work taking place as they may elect to have an on-site representative for inspection purposes. The contractor shall provide **two weeks' notification** to the City of Portland for any and all work to be performed by the City of Portland.

Sewer Manholes To Be Adjusted To Grade

Station	Side	Comment
301+15	**RT**	**SMH**
300+58	**RT**	**SMH**

Station	Side	Comment
212+61	**LT**	**SMH**
214+28	**LT**	**SMH**

Portland Water District, Water

Portland Water District has approximately **four (4) water gate valves** located within the raised intersection of Sherwood and Veranda Streets. PWD intends to loosen and raise their water gate valves prior to paving surface and estimates **1 working day to complete the adjustments**. **PWD will be responsible to make final grade adjustments in conjunction with the paving operations.** The Contractor shall provide **two weeks notification** to PWD for any and all work to be performed by PWD.

Portland Water District has an existing 12" water main that runs the length of Sherwood Street and serves 5 properties. PWD shall partner with this MaineDOT highway project to replace the existing water main with a 12" ductile iron. Work shall include replacement of the watermain and service lines, as well as providing temporary service to the abutting landowners. The work shall also include the installation of a new hydrant assembly and the removal of the existing. All work shall be completed in accordance with Portland Water District's Construction Specifications and all applicable contract documents. All water main replacement, and associated work, shall be constructed from plan sheets and specifications created by VHB (consulting firm of record) from design elements provided by PWD. See plan sheet at the end of the MaineDOT plan set, and appendix sections in the project booklet for the water scope specifications. PWD shall inspect the contractor performing the utility work activities (labor/materials/equipment) necessary for the water main replacement. The Contractor shall be responsible for coordinating quality control, acceptance of the utility work scope, and pay-item quantities directly with PWD. The water main work will be paid for by PWD, and any changes that increase the Work estimate or amount will be paid for through a written modification of this agreement approved by both PWD and the Department. The Contractor shall provide **2 weeks' notification** prior to work taking place as they may elect to have an on-site representative for inspection purposes.

Portland Water District, Sewer
Portland Water District has an existing 15" asbestos sewer interceptor that runs parallel with I295 in the vicinity of the proposed future off-ramp. This sewer line will be relocated to avoid the future ramp and its associated retaining wall. Work shall include the relocation of the sewer line and a temporary bypass pumping system to be utilized during its construction. The work shall be completed in accordance with Portland Water District's Construction Specifications and all applicable contract documents. PWD requests 2 weeks' notification prior to work taking place as they may elect to have an on-site representative for inspection purposes.

MAINTAINING UTILITY LOCATION MARKINGS

The Contractor will be responsible for maintaining the buried utility location markings following the initial locating by the appropriate utility or their designated representative.

UTILITY SIGNING

Any utility working within the construction limits of this project shall ensure that the traveling public is adequately protected at all times. All work areas shall be signed, lighted, and traffic flaggers employed as determined by field conditions. All traffic controls shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, as issued by the Federal Highway Administration.

Portland
028940.10
April 3, 2026

SPECIAL PROVISION 105
CONSTRUCTION AREA

Construction Areas located in the City of Portland have been established by the Maine Department of Transportation (MDOT) in accordance with provisions of 29-A § 2382 Maine Revised Statutes Annotated (MRSA).

The sections of highway under construction in Cumberland County:

WIN 028940.10 *is located in the city of Portland on Sherwood Street beginning 0.02 of a mile west of Veranda Street and extending 0.17 of a mile east. The coastal path is located at the end of Sherwood Street and the future location of the Roux Institute, east of Interstate 295.*

Per 29-A § 2382 (7) MRSA, the MDOT may "*issue permits for stated periods of time for loads and equipment employed on public way construction projects, United States Government projects or construction of private ways, when within construction areas established by the Department of Transportation. The permit:*

A. Must be procured from the municipal officers for a construction area within that municipality;

B. May require the contractor to be responsible for damage to ways used in the construction areas and may provide for:

(1) Withholding by the agency contracting the work of final payment under contract; or

(2) The furnishing of a bond by the contractor to guarantee suitable repair or payment of damages.

The suitability of repairs or the amount of damage is to be determined by the Department of Transportation on state-maintained ways and bridges, otherwise by the municipal officers;

C. May be granted by the Department of Transportation or by the state engineer in charge of the construction contract; and

D. For construction areas, carries no fee and does not come within the scope of this section."

The Municipal Officers for the City of Portland agreed that an Overlimit Permit will be issued to the Contractor for the purpose of using loads and equipment on municipal ways in excess of the limits as specified in 29-A MRSA, on the municipal ways as described in the "Construction Area."

As noted above, a bond may be required by the municipality, the exact amount of said bond to be determined prior to use of any municipal way. The MDOT will assist in determining the bond amount if requested by the municipality.

The maximum speed limits for trucks on any city way will be 25 mph (40 km per hour) unless a higher legal limit is specifically agreed upon in writing by the Municipal Officers concerned.

SPECIAL PROVISION
SECTION 105
General Scope of Work
(Environmental Requirements)

Contractor shall comply with applicable requirements of the permits and approvals listed below, including but not limited to the following special conditions:

I. Pursuant to the USACE Maine General Permits NAE-2024-0011, the following conditions regarding in-water work within tidal waters applies:

1. In-water work within tidal waters shall not be allowed between April 10th and Nov. 7th unless otherwise approved.
    i. **In-water work within tidal waters shall be allowed from Nov. 8th to April 9th**.
2. The work authorized by the Army Corps of Engineers (i.e., work below highest annual tide [HAT], elev. 7.39 ft) shall be completed by October 14, 2026. If not, the Contractor must contact MaineDOT to determine the need for further authorization before beginning or continuing the activity. It is recommended that you contact MaineDOT before this authorization expires to discuss if permit reissuance is a possibility.

II. All activities are prohibited (including the placement and removal of cofferdams unless otherwise permitted by Regulatory Agencies) below the highest annual tide line if outside the prescribed tidal in-water work window, except for the following:

1. Work within a cofferdam constructed according to MaineDOT's Standard Specifications and in adherence with the contractor's approved "Soil Erosion and Water Pollution Control Plan".

III. Special Conditions from DEP:

1. All removed material shall be stored above the HAT elevation (elev. 7.39 feet, as shown on plans).

IV. Special Conditions related to Endangered Species:

1. Direct temporary lighting away from suitable habitat (e.g., trees or abandoned buildings) during the active season.
2. Avoid tree removal/trimming in excess of what is required to implement the project safely.
3. Tree clearing is limited to the area shown on the plans and those limits should be reviewed and/or clearly marked in the field prior to mobilization.
4. Tree clearing (See Standard Specifications Section 201, and/or Pay Item 201.11, 201.12, and 201.13) is not allowed during the bat active season (April 15 – October 15). This is a time of year clearing restriction.

a. Tree clearing is allowed between October 16 and April 14.

V. Approvals:

1. National Environmental Policy Act, Categorical Exclusion Determination issued by MaineDOT on August 1, 2025, WIN 28940.10
2. Natural Resources Protection Act Permit L-30881-4D-A-N/L-30881-4P-B-N/L-30881-2F-C-N/L-30881-TW-D-N
3. Army Corps of Engineers General Permit #NAE-2024-0011
4. Temporary Soil Erosion and Water Pollution Control Plan

SPECIAL PROVISION
SECTION 105
General Scope of Work
(Reserve Limits)

It is hereby brought to the Contractor's attention that use of the following areas and certain work is reserved as follows:

1. Construction of the new PWD sewer main, as shown on Sheets 48 through 54 of the Coastal Path contract plans, and within the temporary construction limits reserved for this project from approximate station 0+10 to 7+50 LT/RT shall not commence until August 1st, 2026. If available sooner, authorization will be granted. This restriction does not apply to any work for construction of the coastal path.

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(Limits of Operations)

1. Only one paving operation will be allowed, excluding hand placed paving and milling, unless otherwise approved by the Resident.

2. Absences must be requested at least 72 hours in advance and are subject to Department approval based on existing roadway conditions, paving deadlines, adherence to schedule, traffic restrictions, detours, etc. The Contractor must assure that the roadway surface and signage are maintained for safe passage of the traveling public during any approved absences. The Contract Completion Date will not be modified due to approved absences.

3. The Contractor's Traffic Control Plan must be operationally effective, complete and in conformity with Federal requirements, Contract provisions, the current edition of the MUTCD and Department policy and procedures as determined by the Department prior to beginning work.

4. The Contractor shall maintain, at a minimum, one 11-foot wide lane, with alternating one-way traffic, at all times.

5. Maine Yacht Center's lease of the MaineDOT triangular parcel (215+33 LT to 217+42 LT) will expire on July 31st, 2026. After this date it will be available for Contractor use.

6. Certain areas, referred to as reserve limit areas on Exhibit B, will not be available until November/December 2026. See Exhibit B for more information.

7. The parking garage construction (3+87 LT to 6+90 LT) by Northeastern University will continue until June 2026. Contractor access in this area will be restricted during this time.

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(Build America, Buy America)

105.11 Other Federal Requirements this section is replaced with the following:

105.11 Build America, Buy America Requirements

Unless expressly otherwise provided in the Bid Documents, the following provisions are hereby incorporated into the Contract.

This project is subject to the Buy America (23 CFR 635.410) and Build America, Buy America Act (BABA) included in the Infrastructure Investment and Jobs Act (IIJA), Public Law No. 117-58. Further guidance can be found at the FHWA Buy America Construction Program Guide linked here:

https://www.fhwa.dot.gov/construction/cqit/buyam.cfm

The Contractor shall certify compliance with Buy America and BABA in the following categories. An article, material or supply should only be classified into one of the following categories and is classified based on its state when it arrives at the project site.

1. **Iron and Steel:** All iron and steel permanently incorporated into the project must be produced in the United States. The only exception to this requirement is the production of pig iron and the processing, pelletizing, and reduction of iron ore, which may occur in another country. This means all manufacturing processes, from the initial melting stage through the application of coatings, must occur in the United States. Any process that modifies the chemical content, the physical size and shape, or the final finish is considered a manufacturing process, including rolling, extruding, machining, bending, grinding, drilling, and coating. "Coating" includes epoxy coating, galvanizing, painting, or any other coating that protects or enhances the value of the material.

Existing De Minimis Use Exemption for Iron and Steel: The requirements of the law and regulations do not prevent a minimal use of foreign steel and iron materials if the total cost of such materials used does not exceed one-tenth of one percent (0.1%) of the total construction contract price or $2,500.00, whichever is greater.

2. **Manufactured Products:** Articles, materials, or supplies that have been processed into a specific form and shape, or combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies. If a domestic product is taken out of the United States for any process, it becomes a foreign source material.

All Manufactured Products used in the project must be manufactured in the United States ("final assembly requirement"). "Component" means an article, material, or supply, whether manufactured or unmanufactured, incorporated directly into a manufactured product or, where applicable, an iron or steel product. If a manufactured product is

predominantly iron, steel, or a combination of both it must meet the above requirements for iron and steel products. Predominantly iron or steel or a combination of both means the total cost of the iron and steel content exceeds 50 percent of the total cost of all its components.

Precast concrete products classified as Manufactured Products must additionally have predominantly iron or steel components meet the above requirements for iron and steel. Cabinets or other enclosures of intelligent transportation systems (ITS) and other electronic hardware systems classified as Manufactured Products must also comply with the above requirements for iron and steel if the cabinet or enclosure is predominantly iron or steel.

3. **Construction Materials:** Items, articles, materials, or supplies that consist of only one of the items listed below:
    i. Non-ferrous metals.
    ii. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables).
    iii. Glass (including optic glass);
    iv. Fiber optic cable.
    v. Optical fiber.
    vi. Lumber.
    vii. Engineered wood; and
    viii. Drywall.

Minor additions of articles, materials, supplies, or binding agents to a Construction Material do not change the categorization of the Construction Material.

All Construction Materials permanently incorporated into the project must be produced in the United States. For the Construction Material to be considered "produced in the United States," it must meet the following standards:

i. Non-ferrous metals. All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.

ii. Plastic and polymer-based products. All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.

iii. Glass. All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.

iv. Fiber optic cable (including drop cable). All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding, and jacketing, occurred in the United

States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic, and polymer-based products, or any others.

v. Optical fiber. All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.

vi. Lumber. All manufacturing processes, from the initial debarking through treatment and planning, occurred in the United States.

vii. Drywall. All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.

viii. Engineered wood. All manufacturing processes, from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

Construction Materials brought on site and combined with other materials are not considered Manufactured Products. Items that consist of two or more of the listed Construction Materials that have been combined off-site through a manufacturing process, and items that include at least one of the listed materials combined with a material that is not listed through a manufacturing process should be treated as Manufactured Products rather than as Construction Materials.

Specifically Excluded Materials

Section 70917(c) of the Build America Buy America Act specifically excludes certain materials from being classified as either construction materials or manufactured products. These exclusions include cement and cementitious materials, aggregates (such as stone, sand, or gravel), and aggregate binding agents or additives.

Additionally, when these materials are combined as an unsettled mixture without a final form upon arriving at the work site, such as wet concrete or hot mix asphalt, the mixture is not considered a manufactured product. However, if these same materials are combined off-site to create a finished product, such as precast concrete, that finished product is considered a manufactured product.

Public Interest Waiver of BABA Requirements for De Minimis Costs

The US Department of Transportation issued a public interest Waiver of Buy America Requirements for De Minimis Costs. The Waiver for De Minimis Costs exempts Manufactured Products and Construction Materials produced outside the United States for which the total value of the non-compliant products is no more than the lesser of $1,000,000 or 5% of total applicable costs for the project.

The obligation to track costs throughout the life of the contract is the Contractor's responsibility. The term "total applicable costs" is defined as the total actual final material cost of the compliant and non-compliant iron and steel, Manufactured Products, and Construction Materials.

Certification

For iron and steel materials and for Manufactured Products produced predominantly of iron or steel or a combination of both*, the Contractor shall submit a certification from the producer of steel or iron, or any product containing steel or iron as a component, stating that all steel or iron furnished or incorporated into the furnished product was manufactured in the United States in accordance with the requirements of the Buy America provisions of 23 CFR § 635.410, as amended. Such certification shall also include (1) a statement that the iron or steel product or component was produced entirely within the United States, or (2) a statement that the iron or steel product or component was produced within the United States, except for minimal quantities of foreign steel and iron valued at $ (actual value). A "Buy America" Certification is required from each manufacturer, fabricator, supplier, subcontractor that engages in "manufacturing" as defined above.

**Predominantly of iron or steel or a combination of both means that the cost of the iron and steel content exceeds 50% of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products, castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of the iron or steel components.*

In addition, upon completion of the project, the Contractor shall certify in writing as to the overall compliance with BABA and provide the total project delivered cost of all foreign Manufactured Products and Construction Materials. The Contractor shall also submit individual certifications from all subcontractors and suppliers that furnish applicable Construction Materials and Manufactured Products valued at $10,000 or more. Such individual certifications shall be submitted upon delivery of the Construction Material or Manufactured Products to the site.

Example certification:

I hereby certify that this project is in compliance with the Build America, Buy America Act (Public Law 117- 58) requirements for this project. All Iron and Steel, Manufactured Products produced predominantly of steel or iron, Manufactured Products and Construction Materials that are permanently incorporated into the work for this project were produced in the United States of America, with the only exceptions as noted below.

As required, we will maintain all records and documents pertinent to the Build America, Buy America Act requirements, at the address given above, for not less than 3 years from the date of Final Acceptance. These files will be available for inspection and verification by the Maine Department of Transportation and/or the Federal Highway Administration.

We further certify that the total value of foreign steel and iron for this project is $_____, said value being less than 0.1% of the total construction contract price or $2,500.00, whichever is greater.

We further certify that the total material cost of foreign Manufactured Products and Construction Materials for this project is $_____, said value being no more than the lesser of $1,000,000 or 5% of total applicable costs. The term “total applicable costs” is defined as the total actual final material cost of the compliant and non-compliant iron and steel, Manufactured Products, and Construction Materials.

Signed (*Contractor*)
(*President*) (*Contractor Firm*)

MaineDOT DBE Project Attainment Target (PAT)

for this Project is **0**%

The MaineDOT seeks to meet the specified annual Disadvantaged Business Enterprise (DBE) usage goal set out by 49 CFR 26.45 through the efforts of contractors seeking to employ qualified DBE subcontractors. We seek to meet this goal by race neutral means and do not, at this time, use contract specific requirements for each project. We do however, understand the capacity of Maine's DBE community and the unique characteristics a project may have that would differ from the broad annual goal.

Taking this into consideration, the MaineDOT will review each project and develop an anticipated attainment or Project Attainment Target (PAT) based on several factors that are project specific. Those factors include:

- ☐ Scope of Work
- ☐ DBE availability according to Specification Item
- ☐ Geographic location
- ☐ DBE capacity

This PAT is developed to assist contractors to better understand the DBE participation that the MaineDOT can reasonably expect for a specific project. The PAT is NOT a mandate but an assessment of the DBE opportunities that this project could meet or exceed. MaineDOT anticipates that each contractor will make the best effort to reach or exceed the PAT for this project.

December 11, 2025

SPECIAL PROVISION
SECTION 106 - HOT MIX ASPHALT PAVEMENT

The following subsections of the most current version of Specification 100 – General Conditions have been revised and amended by the following:

106.7.3 Early Termination of Lots

In the event a Lot in progress is terminated prematurely before the Department is able to take the number of acceptance samples required by the test method specified in the Contract, the following will apply as applicable unless otherwise detailed in the specifications for the item:

1. For items under statistical acceptance where payfactors are generated
    a. If three or more samples have been taken, then payfactors will be generated using the available samples results for the lot.
    b. If the termination was requested by the Contractor and approved by the Department prior to three samples being taken, then each property's payfactor will be set to 0.80.
    c. If the termination was initiated by the Department prior to three samples being taken, then each property's payfactor will be set to 1.00 for each property.
2. For items not under statistical acceptance
    a. If initiated by the contractor and no random sample has been reached the entire lot shall be subject to a penalty of 20% of the item's price.
    b. If initiated by the contractor and only the most recent sample tonnage has not been reached only the tonnage for that sublot will be subject to a penalty of 20% of the items price.

An HMA mix design aim change request from the Contractor with open Lots in progress will constitute a contractor initiated lot termination. For methods A & C, the minimum samples required to generate a pay factor prior to termination will be three. If a minimum of three samples have not been obtained, then each property's payfactor will be set to 0.80. For methods B & D the minimum number of samples (sublots) required prior to an aim change will be the total tonnage of the lot, or a minimum of three, whichever is less. If the minimum number of samples have not been obtained then the pay adjustment for each of the sublot's properties will be set to 0.80.

SPECIAL PROVISION
SECTION 107
TIME
(Contract Time)

- The Contractor shall be allowed to commence Work on the Contract provided that the Contract has been awarded, all required plans/submittals have been received and determined to be acceptable by the Department and a preconstruction meeting has been held.

- The specified Contract Completion Date is **October 29, 2027**. All Work must be Complete by the Contract Completion Date specified in the Contract, and any authorized extensions.

- Once operations commence, the Contractor will continue work on the project until it is complete. For every weekday not worked the Contractor will be charged Supplemental Liquidated Damages at the rates given for liquidated damages in Section 107.7.2 of the Standard Specifications; excluding days lost to inclement weather, holidays, state shut down days and approved absences.

SPECIAL PROVISION
SECTION 203
EXCAVATION AND EMBANKMENT
(Soil Management)

General: The work under this specification shall be performed in conformance with all the procedures and requirements described herein for the following activities: contaminated soil handling, reuse, temporary stockpiling, transportation, storage and disposal, and contaminated water handling, storage, treatment, and disposal. This specification also addresses contaminated soil location, identification, and classification. The intent of this specification is to ensure that any contaminated soil and/or groundwater encountered during construction will be managed in a manner that protects worker health and safety, public welfare, and the environment.

Environmental Site Conditions: The Maine Department of Transportation (MaineDOT) and Vanasse Hangen Brustlin, Inc. (VHB) have conducted an environmental assessment related to the established plans to reconstruct portions of roadway in the East Deering area of Portland, Maine. The environmental assessment for the project area was completed to obtain a general understanding of the environmental conditions within and adjacent to the project area. The assessment included a review of relevant Maine Department of Environmental Protection's (MDEP's) and Environmental Protection Agency's (EPA's) databases and field reconnaissance of the project area. During this assessment it was noted that the properties at 46 Veranda Street, located on the northwest corner of the intersection of Veranda Street and Sherwood Street, and the property at 1 Bean Pot Circle, encompassing 23+ acres on the shoreline of Casco Bay, have a variety of subsurface environmental concerns. Specifically for 46 Veranda Street the property (formerly Colonial Beacon Oil and currently The Grateful Cup) was operated as a gasoline station/automotive repair facility from approximately 1940 until 1982. A subsurface investigation conducted in 1990 identified contaminants of concern to consist primarily of petroleum related constituents and Chlorinated Volatile Organic Compounds (CVOCs). Specifically for 1 Bean Pot Circle, the property (formerly the Burnham & Morrill "B&M" Factory) was operated as a canned food production facility from 1913 to 2021. Subsurface investigations conducted between 1995 and 2024 identified contaminants of concern to consist primarily of petroleum related constituents and metals. If encountered during earthwork activities, contaminated soil and/or groundwater will require proper handling and management.

A Soil Management Plan (SMP) **– Former Colonial Beacon Oil, 46 Veranda Street, Portland, Maine** was prepared (by Ransom Consulting, Inc. – February 2016) on behalf of the property

owner Htmiscellaneous One, LLC, and in accordance with the MDEP Voluntary Response Action Program (VRAP). An Environmental Media Management Plan (EMMP) – **Rev 1, The Roux Institute at Northeastern University, Portland, Maine** was prepared (by Woodard & Curran - April 24, 2024) on behalf of the Initiative for Digital Engineering and Life Sciences (IDEALS) to facilitate proper soil management and disposal procedures during redevelopment activities at the 1 Bean pot Circle property. Refer to **Appendix A** for a copy of the SMP and the EMMP. The subject SMP and EMMP shall be utilized in combination with this Special Provision by the Contractor as the guide for handling contaminated soil/groundwater – identification, classification, handling, and management. Environmental data related to this project are available for review from MaineDOT's Environmental Office in Augusta (207-624-3000).

Identified Area of Contamination: Environmental characterization completed at the 46 Veranda Street property indicates that the entire property was identified as an area of contamination. The SMP also indicates that contamination may have migrated off-site and into the MaineDOT right-of-way. As a result, the SMP includes and specifies that installation, repair, and maintenance of underground utilities, pavement, sidewalks, and landscaping activities encountering contaminant impacts in the MaineDOT right-of-way also must adhere to soil and groundwater handling and management specifications as defined in the SMP and this Special Provision.

Environmental characterization completed at the 1 Bean Pot Circle property indicates that the entire property was identified as an area of contamination, except in the instance where naturally deposited native materials consisting of glacimarine clay that has been previously characterized are encountered below fill materials.

The entire MaineDOT project area is therefore considered within an area of contamination. A specific MaineDOT project area, within the larger project, is designated as **"Area A"**. The location of **Area A** is defined as being in the vicinity of 46 Veranda Street - The Grateful Cup, roughly between MaineDOT Survey Station 301+00 and Station 301+98 – right and left of centerline, and between Survey Station 400+00 and Station 401+00 – right and left of centerline**. Area A** is referred to further in this Special Provision as it has requirements that specifically address the groundwater contamination identified near the 46 Veranda Street property.

Identifying and Screening Contaminated Soil and Groundwater: Within the entire project, Excavated soils will be classified by the Resident (or a MaineDOT representative) based on photo-ionization detector (PID) field screening measurements following the **Excavation-Construction Worker Cleanup Scenario** as prescribed in Table 1 – Approved PID Field Cleanup and Notification Guidelines in **MDEP Standard Operating Procedure (SOP) TS004 – COMPENDIUM of FIELD TESTING of SOIL SAMPLES for GASOLINE and FUEL OIL (10/15/2012)**.

Excavated soils shall be classified as Group 1, Group 2, or Group 3.

Group 1 soils shall be clean, naturally deposited, uncontaminated soils as demonstrated by analytical testing (i.e., contaminants of concern not detected above laboratory reporting limits

and metals below background concentrations). Group 1 soils shall also have no visible or olfactory evidence of contamination (e.g., coal, ash, cinders, debris, and/or dark brown or black color). Soils shall have PID field screening measurements indicating relative concentrations of volatile organic compounds (VOCs) less than or equal to those in background concentrations as measured in 5-gram bag-headspace sample and an "Undetected" result using an oleophilic dye test. Based on the findings of investigations completed at the 1 Bean Pot Circle property, naturally deposited marine clay that may be encountered during construction is considered to meet the definition of Group 1. Additional characterization sampling is required to delineate additional native material that is proposed for management as Group 1 soil if other types of native material is to be transported offsite for reuse or disposal.

Group 2 soils have detectable concentrations of contaminants of concern and/or metal concentrations above background; exhibit visible and/or olfactory evidence of contamination; have PID field screening measurements indicating VOC concentrations greater than background concentrations as measured in a 5-gram bag-headspace sample and less than the value indicated in Table 1 of SOP-TS004 when screened in accordance with the **Excavation-Construction Worker Cleanup Scenario** OR indicate a "Slightly Positive" result using an oleophilic dye test. Visual evidence of contamination may include coal, ash, cinders, debris, and/or dark brown or black color. Based on the findings of investigations completed at the 1 Bean Pot Circle property, fill material has been characterized as Group 2, pending the observation of unexpected conditions, which could reclassify this material as Group 3 (below).

Group 3 soils shall exceed the threshold limit stated in the TS004 Compendium of Field Testing of soil samples exceeding the **Excavation-Construction Worker Cleanup Scenario** or indicate a "Saturated" / "Positive" result using an oleophilic dye test. Soils are also categorized as Group 3 if found to fall into the category of a Hazardous Waste on the basis of a toxicity characteristic leaching procedure (TCLP) or other laboratory testing.

Handling and Disposition of Soil Materials: In general, soils excavated during construction shall be handled as follows:

Group 1 soils are not considered contaminated. Thus, special handling is not required for Group 1 soils. Group 1 soils may be reused off site as fill in non-residential construction projects without the need for additional Maine DEP permitting. Documentation of the proposed non-residential use application shall be provided to the Resident prior to offsite shipment.

Group 2 soils shall be placed back into their excavation section of origin. The Contractor shall make every attempt to side cast any Group 2 soils next to the excavation site. Upon completion of the given constructional feature, Group 2 soils shall be placed back into the excavation up to 2 feet below ground surface. Group 2 materials not handled in this manner shall be considered Surplus Group 2 soils. Surplus Group 2 soils must be disposed of or treated at a facility licensed by the MDEP to accept contaminated special waste. The Contractor is solely responsible for obtaining associated permits and approvals for disposal

or treatment of the Surplus Group 2 soils from relevant Municipal, State, and Federal agencies at no additional cost to the State. Documentation of the proposed disposal facility shall be provided to the Resident prior to offsite shipment. Notification shall also be given to the Resident once approval is granted for the acceptance of this material at the off-site facility. No removal of Surplus Group 2 soil from the project shall occur without prior approval by the Resident. If any Surplus Group 2 soils cannot be transported to the pre-approved, properly licensed facility within 8 hours of their excavation, they must be placed in a Temporary Secure Stockpile Area somewhere within the project limits (See Temporary Secured Stockpile Area below).

Group 3 soils shall not be excavated without prior approval by the Resident. The Contractor shall arrange and undertake disposal of all Group 3 soils at a landfill or treatment facility licensed to accept petroleum contaminated special waste and/or a listed or characteristic hazardous waste, as applicable. Documentation of the proposed disposal facility shall be provided to the Resident prior to offsite shipment. Notification shall also be given to the Resident once approval is granted for the acceptance of this material at the off-site facility. The Contractor is responsible for all additional testing required by the receiving facility. Group 3 soils that cannot be disposed of within 8 hours of excavation shall be stored in a Temporary Secured Stockpile area. If the Contractor proposes other disposal or treatment options, the Contractor is solely responsible for obtaining the associated permits and approvals from relevant Municipal, State, and Federal agencies at no additional cost to the State.

The Resident is responsible for signing any manifests or bills of lading required to transport and dispose of contaminated soil. The Resident will send all manifests and bills of lading to MaineDOT, Environmental Office, Station 16, Augusta, Maine 04333.

Trench and Underdrain/Storm Drain Design in Contaminated Sections In **Area A,** solid, Option III, non-perforated pipe shall be used in replacement of perforated underdrain pipe to help prevent the infiltration and transportation of potentially contaminated groundwater within the underdrain/storm drain system. The Contractor shall backfill around the pipe and trenches in this section with uncontaminated material. Backfilling of the trench shall be in accordance with Section 206.03. All stones larger than 3 inches, frozen lumps, dry chunks of clay or any other objectionable matter shall be removed before backfilling.

Seepage control dikes (SCD) shall be installed roughly every 60 feet along the stormwater pipe trench.

SCDs shall consist of a mineral clay material with a liquid limit of equal to or greater than 24 and a natural moisture content of at least 20 percent. The clay should be placed in dry excavations in 6-inch maximum, thick lifts and compacted to 90% of the maximum dry unit weight as determined by AASHTO T99 (Standard Proctor). The SCDs shall be 5 feet long, be in intimate contact with the trench floor, trench walls and circumference of the pipe and extend up to the bottom of the road base. The excavated existing road base or similar material may be placed on top of the SCDs. The Contractor shall take care to ensure that no voids or uncompacted soil is left beside or beneath

the Option III culvert pipe.

Secured Stockpile Area Direct transport of Surplus Group 2 or Group 3 soils to a pre-approved management facility is recommended. However, should the Contractor temporarily store any Surplus Group 2 or Group 3 soils at the site for more than 8 hours following excavation, they must be placed into a properly constructed Temporary Secured Stockpile Area. The Temporary Secured Stockpile Area must be constructed as defined herein and must be approved by the Resident prior to its use.

Should the Contractor utilize a Temporary Secured Stockpile Area, they shall install a continuous 0.3-meter-high compacted soil berm around the Secured Stockpile. The Secured Stockpile shall be placed on a liner of 20-mil polyethylene and securely covered with 20-mil polyethylene. The polyethylene liner and cover shall be placed over the soil berm and be installed to ensure that precipitation water drains directly to the outside of the berm perimeter while leachate from the contaminated soil is retained within the stockpile. The Secured Stockpile and soil berm shall be enclosed within a perimeter of concrete Jersey barriers or wooden barricades. The area within the Jersey barriers (or wooden barricades) shall be identified as a "restricted area" to prevent unauthorized access to the contaminated soil.

Secured Stockpile Area - Materials

A. Polyethylene. Polyethylene used for liner in the Secured Stockpile Area shall have a minimum of 20-mil thickness and shall meet the requirements of ASTM D3020.

B. Common Borrow. Fill used in the construction of the Temporary Secured Stockpile Area soil berm shall consist of Common Borrow and meet the requirements of Section 703.18

C. Concrete Barriers or Wooden Barricades. Concrete barriers or Wooden Barricades to form the sides of the Temporary Secured Stockpile Area shall meet the requirements of Section 526 or 652.05.

Health and Safety/Right-to-Know Contractors and subcontractors are required to notify their workers of the history of the site and contamination that may be present and to be alert for evidence of contaminated soil and groundwater. The Contractor shall notify the Resident **at least three business days** prior to commencing any excavation.

The Contractor shall prepare a site-specific Health and Safety Plan (HASP) for its workers and subcontractors who may work in the contaminated areas of the site. A Qualified Health and Safety Professional shall complete the HASP. The Qualified Health and Safety Professional will be an expert in field implementation of the following federal regulations:

29 CFR 1910.120 or	Hazardous Waste Operations and
29 CFR 1926.65	Emergency Response

29 CFR 1910.134	Respiratory Protection
29 CFR 1926.650	Subpart D - Excavations
29 CFR 1926.651	General Requirements
29 CFR 1926.652	Requirements for Protective Systems

MaineDOT is voluntarily ameliorating contamination that may be encountered. Remedial efforts defined herein have been reviewed and approved by MDEP. Given that this is a voluntary cleanup effort approved by a regulatory agency, the OSHA requirements as defined in 29 CFR 1910.120 apply. These requirements mandate that workers and any subcontractors working in the contaminated areas shall comply with all OSHA regulations for Hazardous Waste Operations and Emergency Response including a 40-hour initial hazardous waste operations certification [OSHA 1910.120(e)], annual 8-hour refresher course within the last 12 months and medical surveillance [OSHA 1910.120(f)] within the last 12 months.

The Contractor shall designate a person to provide direct on-site supervision of the work in the contaminated areas. This person shall have the training under OSHA 1910.120 (e) as above and in addition be qualified as a construction Competent Person. It is the responsibility of the competent person to make those inspections necessary to identify situations that could result in hazardous conditions (e.g., possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions), and then to ensure that corrective measures are taken.

Submittals The Contractor shall submit a site-specific Health and Safety Plan (HASP) to the Resident at least two weeks in advance of any excavation work on the project. The Contractor shall not proceed with work until MaineDOT has reviewed the plan and notified the Contractor that it is acceptable.

Health and Safety Monitoring Within the contaminated areas of the project, the Contractor's designated on-site person shall monitor the worker breathing zone for those constituents specified in the Contractor's HASP. The Contractor shall provide all required health and safety monitoring equipment.

Dewatering Groundwater may be encountered and its removal necessary to complete work **.** Within **Area A**, it will be treated as "contaminated" water. The Contractor shall inform the Resident before any dewatering commences. "Contaminated" water shall be pumped into a temporary holding tank(s). The Contractor will be responsible for the procurement of any holding tank(s). Any testing, treatment and/or disposal of the stored, petroleum-contaminated water shall be undertaken by the Contractor in accordance with applicable Federal, State and local regulatory requirements. Within the remainder of the project area, the condition of the groundwater shall be monitored during dewatering activities as petroleum-impacted groundwater is not anticipated to be encountered. If encountered, impacted groundwater may be identified by a petroleum or solvent

odor, presence of a petroleum sheen, or field screening of soil wetted by groundwater. If dewatering is necessary to facilitate construction, the water will be pumped from the excavation and either:

1. Discharged to the ground surface within the immediate work area, provided that appropriate best management practices are implemented (e.g., erosion and sedimentation controls, engineered infiltration basin) to prevent the offsite migration of the generated materials.

2. Reinjected into the ground by sumps excavated onsite with the location documented by Environmental Professional.

3. Discharged to the municipal sewer system in accordance with all local, State, and Federal requirements. In this instance, the water may need to be containerized (e.g., fractionation tank), tested, and pretreated, if necessary, prior to disposal to meet the requirements of the Portland Water District. A Dewatering Plan and Application must be submitted and approved prior to discharging water from a construction site to City of Portland infrastructure. Typical analytical requirements are listed below:

    - pH and conductivity
    - total metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc)
    - total cyanide
    - EPH and VPH

4. Managed onsite in appropriate containers (e.g., fractionation tank) for subsequent waste characterization and offsite disposal. Waste characterization must be conducted in accordance with the selected disposal facility's acceptance requirements.

If the presence of petroleum or other unexpected conditions are encountered in association with groundwater, the dewatering activities shall stop. Site personnel shall then notify the Resident to assist in planning further dewatered groundwater management.

On-Site Water Storage Tanks – Materials If dewatering within the identified contaminated area becomes necessary, the holding tanks used for temporary storage of contaminated water pumped from excavations shall be contamination free and have a minimum capacity of 2,000 gallons.

Dust Control The Contractor shall employ dust control measures to minimize the creation of airborne dust during the construction process in potentially contaminated areas. As a minimum, standard dust control techniques shall be employed where heavy equipment and the public will be traveling. These may include techniques such as watering-down the site or spreading hygroscopic salts.

Unanticipated Contamination If the Contractor encounters previously undiscovered contamination or potentially hazardous conditions related to contamination, the Contractor shall

immediately suspend work and secure the area. The Contractor will then notify the Resident immediately. These potentially hazardous conditions include, but are not limited to, buried containers, drums, tanks, "oil saturated soils", strong odors, or the presence of petroleum sufficient to cause a sheen on groundwater. The area of potential hazard shall be secured to minimize health risks to workers and the public and to prevent the release of contaminants into the environment. The source of any suspected contamination shall be evaluated by the Resident (or MaineDOT's ENV representative). As appropriate, the Resident will notify MDEP Response Services Unit in Portland and MaineDOT-ENV. The Portland Fire Department must also be notified prior to removal of buried storage tanks and associated piping. The Contractor will evaluate the impact of the hazard on construction, amend the HASP if necessary, and with the Resident's approval, recommence work in accordance with the procedures of this Special Provision.

Method of Measurement There will be no measurement for identification and environmental screening of contaminated soil material (this will be done by the Resident or MaineDOT-ENV representative).

Measurement for the development of a Health and Safety Plan (HASP) and providing health and safety equipment and personnel shall be by lump sum.

Measurement of the off-site treatment or disposal of Surplus Group 2 and all Group 3 soils will be by the ton of Special Excavation.

There will be no measurement for construction of a Temporary Secured Stockpile Area. Construction of a Temporary Secured Stockpile Area, if necessary, is considered incidental to project construction. There will be no measurement for hauling Surplus Group 2 material or Group 3 soils to the Temporary Secure Stockpile area or placement and removal of Surplus Group 2 or Group 3 soils in or out of the Temporary Secure Stockpile area. All hauling and any subsequent management/placement of contaminated soils are considered incidental to project construction.

There will be no measurement for additional laboratory testing of contaminated soil that is required by the landfill or treatment facility. Testing is incidental to the disposal of Special Excavation. Measurement for the following items shall be according to Subsection 109:04 ("Change Order"/Force Account): any necessary contaminated water holding tank(s); and treatment or disposal of any contaminated groundwater.

Basis of Payment There will be no payment for the identification and environmental screening of contaminated soil material (this will be completed by the Resident or MaineDOT-ENV representative).

Payment for the development of a Health and Safety Plan (HASP) and providing health and safety equipment and personnel shall be by the lump sum (L.S.).

Payment for off-site disposal or treatment of contaminated Surplus Group 2 and all Group 3 soils at a MDEP licensed facility shall be by the ton of Special Excavation.

There will be no payment for the construction of the Temporary Secured Stockpile Area or

hauling/management/placement of contaminated soils to the Temporary Secured Stockpile Area. The Temporary Secured Stockpile Area shall be considered incidental to project construction.

Payment for the following items shall be according to Subsection 109:04 ("Change Order"/Force Account): any necessary contaminated water holding tank(s); and treatment or disposal of any contaminated groundwater.

Pay Item		**Pay Unit**
203.2312	Health and Safety Plan (HASP)	Lump Sum
203.2333	Disposal/Treatment of Special Excavation, Group 2	Ton
203.3333	Disposal/Treatment of Special Excavation, Group 3	Ton

APPENDIX A

Soil Management Plan
Former Colonial Beacon Oil
46 Veranda Street – Portland, ME

SOIL MANAGEMENT PLAN
FORMER COLONIAL BEACON OIL
46 VERANDA STREET
PORTLAND, MAINE

Prepared for:

Htmiscellaneous One, LLC
9 Adams Street
Peaks Island, Maine

Submitted to:

Ms. Tracy W. Kelly

Maine Department of Environmental Protection
Bureau of Remediation and Waste Management
Voluntary Response Action Program
17 State House Station
Augusta, Maine

Prepared by:

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Portland, Maine 04101
(207) 772-2891

February 9, 2016
Project 151.06124



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TABLE OF CONTENTS

1.0 PURPOSE 1

2.0 BACKGROUND 2
2.1 Site History 2
2.2 Previous Site Investigations 2

3.0 SITE CONDITIONS AND CRITERIA 3
3.1 Availability of the Soil Management Plan 3
3.2 Activities Covered Under this Soil Management Plan 3
3.3 Contaminants of Concern 3
3.4 Areas of Concern 3
3.5 Guidelines Applied 3
3.6 Exposure Pathways & Scenarios 3
3.7 Accessibility of Soil 4
3.8 Engineering Controls 4

4.0 MAINTENANCE OF SOIL COVER 5

5.0 SOIL MANAGEMENT PLAN 6
5.1 Notification to MEDEP VRAP Program 6
5.2 Environmental Professional Oversight 6
5.3 Best Management Practices 6
5.4 Safety 6
5.5 Contamination Identification 6
5.6 Soil Excavation & Management of Excavated Soil 7
5.7 Soil Reuse/Disposal Options 7
5.8 Containment/Stockpiling/Storage 8
5.9 Backfilling Criteria 8
5.10 Waste Characterization Sampling for Off-Site Reuse/Disposal of Soil 8
5.11 Groundwater Management 10
5.12 Documentation of Site Activities 10

APPENDIX A 13

FIGURES

Figure 1: Site Location Map
Figure 2: Site Plan

APPENDICES

Appendix A: Maine Department of Environmental Protection's (MEDEP's) Standard Operating Procedure (SOP) TS004

1.0 PURPOSE

On behalf of Htmiscellaneous One, LLC, Ransom Consulting, Inc. (Ransom) has prepared the following Soil Management Plan in support of the redevelopment of the property located at 46 Veranda Street in the City of Portland, Cumberland County, Maine (the "Site"). Please refer to the appended Figure 1 for the Site Location map, and Figure 2, Site Plan, for the layout of the Site and adjoining properties.

Contaminated soils have been identified at this Site. In the event that contaminated soils are encountered or otherwise disturbed during Site redevelopment, it is necessary to have established procedures in place to determine the severity of the contamination and to safely handle and dispose of the contaminated soil. This plan describes the procedures that must be followed when contractors, employees, or other persons are engaged in excavation or other soil-disturbing activities at the Site.

Any persons engaged in excavation or other soil disturbing activities at the Site must follow the specific requirements set forth in this plan.

The Site has been submitted and accepted to the Maine Department of Environmental Protection (MEDEP) Voluntary Response Action Program (VRAP). As one of the continuing obligations by the property owner, this plan was developed in order to receive continued liability protections granted by the MEDEP as part of the owner's participation in the VRAP. The VRAP would allow for MEDEP to review and approve of proposed soil management actions to be performed, and assuming the MEDEP concurs with the soil management activities proposed at the Site, would provide liability protection to Htmiscellaneous One, LLC, its successors/assigns, lenders, fiduciaries, and financiers in accordance with 38 M.R.S.A. § 342 (15) and § 343-E. It is the responsibility of the property owner to ensure that this management plan is followed. If you have questions regarding the requirements of this plan, please contact staff in the MEDEP's VRAP at (207) 287-4854.

2.0 BACKGROUND

2.1 Site History

The Site consists of an approximate 0.17-acre, rectangular-shaped parcel of land located at the northern corner of the intersection of Sherwood Street and Veranda Street. The property is identified by the City of Portland Assessor's Office as Lot 4, of Block A on Tax Map 429, which corresponds to 46 Veranda Street.

Based on available information, the Site is improved with one building (the "Site building"), which operated as a gasoline filling/full-service automotive repair facility from circa 1940 to circa 1982. The Site was occupied by a bakery and take-out pizza restaurant from the 1980s to 2015. The Site is proposed to be redeveloped for mixed residential and commercial purposes.

2.2 Previous Site Investigations

In 1990, a subsurface environmental investigation was conducted at the Site. Results of this investigation identified subsurface soils at the Site impacted by petroleum constituents at a concentration that currently does not exceed MEDEP's most conservative (Residential) Remedial Action Guideline (RAG) for petroleum hydrocarbon fractions. In 1991, MEDEP issued a "Position Letter" indicating that the petroleum-impacted soils identified at the Site did not require remediation, as long as they remain undisturbed in the subsurface. However, MEDEP recommended that the petroleum-impacted soils should be properly managed and disposed off-Site, if they are displaced during future redevelopment of the property.

In September 2015, Ransom conducted a soil vapor and indoor air sampling investigation at the Site. Based on the results of this investigation, Ransom concluded that soil vapor at the Site has been impacted with petroleum-related compounds and chlorinated volatile organic compounds (CVOCs), which were likely associated with known or previously identified petroleum-contaminated soil at the Site and/or unknown or undocumented oil and/or hazardous material (OHM) releases during the Site's use as a gasoline filling/full-service automotive repair facility. Although, soil vapor at the Site has been adversely impacted by OHM release(s), the contaminants were not detected in the indoor air of the existing Site building at concentrations that would pose a significant \ exposure risk to current or future occupants or employees from vapor intrusion into the building. However, it's likely that localized area(s) of CVOC-impacted soil and/or groundwater may be present at the Site, which should be properly managed and disposed off-Site, if they are displaced during future redevelopment of the property.

To date, groundwater has not been sampled/evaluated for potential contamination during previous environmental investigations at the property. However, public water is available to the Site and vicinity. Therefore, direct exposure from ingestion of contaminated groundwater, if present, is not a significant concern or risk at this Site.

3.0 SITE CONDITIONS AND CRITERIA

3.1 Availability of the Soil Management Plan

This Soil Management Plan must be maintained by the property owner and his or her representatives as part of the continuing obligations for this property in accordance with the Site's involvement with the MEDEP VRAP. A copy of this Soil Management Plan must be provided to employees, contractors, subcontractors, and other persons who may contact or disturb soils being managed by this plan.

3.2 Activities Covered Under this Soil Management Plan

This Soil Management Plan has been prepared to provide guidelines for the proper on-Site and off-Site management/disposal of contaminated soils identified at the Site that may be encountered during earthwork activities. These activities may include, but are not limited to, building demolition, building construction/addition, installation/repair/maintenance of underground utilities, pavement and sidewalk construction/repair, and landscaping activities. If soils exhibiting visual evidence of contaminants are encountered during earthwork activities at the Site, these materials will be subject to the following Soil Management Plan, and the basic health and safety procedures outlined in this plan will be followed for excavation, stockpiling, and/or backfilling activities associated with these soils.

3.3 Contaminants of Concern

Based on the results of previous environmental investigations performed at the Site, the following contaminants of concern (COCs) were identified in soils:

1. Petroleum Constituents; and

2. Chlorinated Volatile Organic Compounds (CVOCs).

3.4 Areas of Concern

Based on the results of previous environmental investigations performed at the Site and information indicating that the entire property was utilized as a gasoline filling/service station, the entire Site was identified as an area of concern (AOC) for potential petroleum- and CVOC-contamination.

3.5 Guidelines Applied

Based on the proposed residential and commercial use of the property with no evidence of petroleum-saturated and/or free-product petroleum-impacted groundwater identified during previous environmental investigations performed at the Site, the risk-based guidelines of the Maine RAGs for Sites Contaminated with Hazardous Substances, dated May 10, 2013 apply to soils managed during earthwork-related activities at the Site.

3.6 Exposure Pathways & Scenarios

Based on the current and proposed residential and commercial use of the property, the "Residential" and "Outdoor Commercial Worker" RAGs are considered to be the most applicable guidance standard for surficial soils (0 to 2 feet below ground surface[bgs]) at the Site. In addition, potential exposure risks to Site workers during future construction activities and utility work exists at the Site. Therefore,

"Excavation/Construction Worker" RAGs also apply to surficial soils (0 to 2 feet bgs) and areas at the Site in the vicinity of subsurface utilities (subsurface is defined as deeper than 2 feet bgs) in order to evaluate potentially unacceptable risks to excavation or construction workers during future subsurface utility work at the Site.

Public water is supplied to the Site and vicinity; therefore, ingestion of impacted groundwater does not pose a risk at this time. Therefore, "Groundwater Construction Worker" RAGs would be the most applicable guidance standard to compare analytical results of groundwater at the Site in order to assess potential costs for managing contaminated groundwater and potentially unacceptable risks to construction workers during future subsurface construction and/or utility work at the Site.

3.7 Accessibility of Soil

Based on the MEDEP RAGs and the results of previous environmental investigations performed at the Site, the following is a summary of accessibility to contaminated soils.

Accessible Soil:

"Accessible" soils are located less than two feet below the surface and the surface is not completely covered by pavement. Currently, no COCs have been investigated in "accessible" soils at the Site.

Potentially Accessible Soil:

"Potentially accessible" soils are located at a depth of 2 to 15 feet below the surface (with or without pavement) at the Site. At the present time, "potentially accessible" soils contain petroleum compounds at concentrations below their respective MEDEP RAGs.

Isolated Soil:

"Isolated" soils are located at a depth greater than 15 feet below the surface. Currently, no COCs have been investigated in "Isolated" soils at the Site.

3.8 Engineering Controls

Engineering controls have currently not been recorded and/or implemented at the Site. A Declaration of Environmental Covenants (DEC) is proposed to be approved by MEDEP VRAP and recorded at the Cumberland County Registry of Deeds. The DEC is proposed to require adherence to a Soil and Management Plan for future earthwork activities at the Site.

4.0 MAINTENANCE OF SOIL COVER

The Site is currently improved with soil cover systems, including the Site building, asphalt-paved parking lot/driveways, and grassed/landscaped areas, which prevent direct contact exposure to low-level, impacted soils at the Site. Future redevelopment will also include the construction of new soil cover systems, including new building(s), asphalt-paved parking lots/driveways, brick and/or concrete sidewalks, and landscaped areas.

Currently, no COCs have been identified in Site soils at concentrations exceeding their respective MEDEP RAGs. Therefore, maintenance of soil cover systems is currently not required by MEDEP VRAP at the Site. However, if COCs are identified in Site soils at concentrations exceeding their respective RAGs in the future, these soils should be properly managed under the soil cover systems. This will ensure that these impacted soils will remain undisturbed under these cover systems, and thereby limiting current and future occupants' and workers' potential exposure to these impacted soils at the Site.

5.0 SOIL MANAGEMENT PLAN

5.1 Notification to MEDEP VRAP Program

The MEDEP VRAP is required to be notified of earthwork activities at the Site during Site redevelopment. Earthwork activities at the Site are required to adhere to this Soil Management Plan except for activities associated with imported clean fill (i.e., construction of landscaping areas). Any future disturbance, relocation, or off-site disposal of contaminated soil identified at the Site shall not occur without MEDEP's notification and expressed written approval.

5.2 Environmental Professional Oversight

Soil management activities at the Site are not required to be overseen by a qualified environmental professional. However, in the event that contaminated soils are encountered during earthwork activities that require segregation, stockpiling, and/or off-site disposal, a qualified environmental professional should be notified to assist with these soil management activities.

5.3 Best Management Practices

Best management practices should be implemented during earthwork activities, such as erosion and sedimentation control (e.g., silt fences, hay bales, and revegetating disturbed soils) in order to prevent Site soils from eroding and/or washing into the nearby surface water drains (i.e., catch basins) that reportedly discharge into Casco Bay.

5.4 Safety

Basic health and safety procedures should be implemented while performing earthwork activities within contaminated soils. The procedures are intended as a general guideline for basic, short-term excavation activities. More site-specific health and safety procedures may be warranted for complex or extended duration subsurface work. These basic health and safety procedures/guidelines should in no way replace other site-specific health and safety procedures potentially required by each individual contractor or subcontractor working at the Site. Workers that are permitted to engage in operations that could expose them to hazardous wastes, hazardous substances, safety or health hazards should have obtained the necessary health and safety training and medical surveillance, as specified in the applicable provisions of the following regulations; Occupational Safety and Health Administration (OSHA) Standards including General Industry, Construction Industry (29 CFR 1926), Personal Protective Equipment (29 CFR 1910.132), Hazard Communication (29 CFR 1910.1200), Occupational Noise Exposure (29 CFR 1910.95), Respiratory Protection (29 CFR 1910.134), and Hazardous Waste Operations and Emergency Response standards (29 CFR 1910.120).

5.5 Contamination Identification

Contaminated soils at the Site include known petroleum constituents and potential CVOC contaminants. These soils likely exhibit petroleum odors, staining, and/or elevated total volatile organic concentrations (TVOCs) as detected with a photoionization detector (PID). In the event that unknown/abandoned underground storage tanks (USTs), buried drums, or free-phase petroleum product are discovered at the Site, the qualified environmental professional and MEDEP should be contacted to make an evaluation and possible subsequent response actions.

5.6 Soil Excavation & Management of Excavated Soil

Once it is determined that 1) contaminated soils are to be excavated during earthwork activities, 2) these contaminated soils are proposed to be either reused on-Site or will require off-site reuse or disposal ("displaced or excess soil"), and 3) an environmental professional has been notified and mobilized to the Site, the following actions should be taken for preparation of potential off-site disposal/reuse:

1. Apparent contaminated soils should be segregated from apparent non-contaminated soils and should be stockpiled separately for potential off-site disposal; and

2. Soils proposed to be reused on-Site and/or excess soils generated during earthwork activities that are suspected of containing urban fill contaminants must be temporarily stockpiled on-Site on top of one layer of at least 6-mil polyethylene sheeting.

Factors indicating the need for segregation and stockpiling petroleum- and/or CVOC-impacted soils separately from apparent cleaner material will include the following:

- Visual observations (e.g., petroleum staining);
- Olfactory indicators (e.g., petroleum odors);
- Field screening with a PID and/or oleophilic dye tests for organic vapors or petroleum hydrocarbons for evidence of contamination in accordance with MEDEP's Standard Operating Procedure (SOP) TS004 (Appendix A); and/or
- Confirmatory laboratory chemical testing for waste characterization parameters.

If deleterious fill material (i.e., concrete foundations/pilings, wood, bricks, etc.) are encountered during Site redevelopment that require off-site disposal as demolition waste, the qualified environmental professional will assess for the potential presence of contaminated soils that may be adhered to the deleterious material. Contaminated soils should be removed from the deleterious materials (i.e., brushed off, steam cleaning, pressure washing, etc.) prior to their anticipated off-site disposal as demolition waste.

5.7 Soil Reuse/Disposal Options

The following scenarios are listed in order on how contractor(s) should proceed with managing displaced soil during Site redevelopment in order to save overall project costs and prevent delays:

1. **Scenario #1 (preferred-case, when possible):** Reuse displaced contaminated soils on-Site unless they petroleum-saturated. If petroleum-saturated soils are encountered, MEDEP should be contacted to make an evaluation and possible subsequent response actions;

2. **Scenario #2: Transport "excess clean soils" off-site for "unrestricted use" with prior MEDEP approval**. Please note that these "excess soils" shall not contain urban fill constituents (i.e. bricks, coal, and ash), exhibit visual or olfactory evidence of petroleum- or CVOC-contamination, and the laboratory analysis of these soils must indicate that all COCs do not exceed their respective MEDEP "Residential", "Leaching to Groundwater" and/or "Undeveloped Maine Background" RAGs.

3. **Scenario #3: Transport "excess contaminated soils" off-site to a licensed landfill, asphalt batch plant, and/or other MEDEP-approved disposal facility**. Please note that this scenario is warranted for petroleum-saturated soils and displaced soils that cannot be reused on-Site that contain urban fill constituents (i.e. bricks, coal, and ash), exhibit visual or olfactory evidence of petroleum- or CVOC-contamination, and the laboratory analysis of these soils indicate that COCs are detected at concentrations exceeding their respective MEDEP "Residential", "Leaching to Groundwater" and/or "Undeveloped Maine Background" RAGs.

5.8 Containment/Stockpiling/Storage

Stockpile(s) of suspected contaminated soil should be covered with at least 6-mil polyethylene sheeting and the sheeting secured daily. Roll-off containers for this same purpose that are used at the Site should be securely covered during temporary storage at the Site. 55-gallon drums generated at the Site should be labeled with regard to the disposition of the soil, the date of generation, hazards associated with the soil, and the name of a person to contact with questions. Soils proposed to be reused on-Site and/or excess soils generated during earthwork activities that are not suspected to be contaminated do not need to be stockpiled on or covered with polyethylene sheeting.

Contaminated soil stockpiles should be evaluated daily by the earthwork contractor. Tears or punctures observed in the polyethylene sheeting should be repaired or the sheeting replaced. The assessment will also confirm that, to the extent possible, storm water runoff is diverted away from the piles. If storm water runoff is expected or observed to be impacted by the stockpiled soil, the soil stockpiles will be surrounded by hay bales or silt fencing to minimize impacts to storm water runoff.

5.9 Backfilling Criteria

Soils suspected of containing contaminants previously identified at the property can either be re-used on-Site or transported off-Site in accordance with MEDEP's Solid Waste regulations, with prior notification and expressed written approval from the MEDEP.

5.10 Waste Characterization Sampling for Off-Site Reuse/Disposal of Soil

The following waste characterization sampling would be necessary to properly reuse apparent "clean soils" or "native soils" off-Site for "unrestricted use" and/or dispose of petroleum- and/or CVOC-impacted soils at a landfill or asphalt batch plant.

- MEDEP has required 1 waste characterization laboratory sample of **apparent "clean or native" stockpiled soils** for every 250 tons (approximately 200 cubic yards of soil).

- Waste characterization samples should be collected from **apparent petroleum- and/or CVOC-impacted soil stockpiles** depending on the volume of stockpiled soil and requirements of the anticipated receiving facility (minimum of one soil sample per 250 cubic yards).

At a minimum, the soil samples will be analyzed for one or more of the following waste characterization parameters:

1. Volatile organic compounds (VOCs) by U.S. EPA Method 8260;

2. Volatile petroleum hydrocarbon (VPH) fractions, excluding target petroleum VOCs, by MA DEP Method 98-1 (VPH Standard);

3. Extractable petroleum hydrocarbon (EPH) fractions, excluding target PAHs, by MA DEP Method 98-1 (EPH Standard);

4. Semi-volatile organic compounds (SVOCs) with PAHs by U.S. EPA Method 8270;

5. Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) plus vanadium by U.S. EPA Method Series 6000/7000;

6. Polychlorinated Biphenyls (PCBs) by U.S. EPA Method 8082;

7. Flashpoint by U.S. EPA Method 1010;

8. Corrosivity (pH) by U.S. EPA Method 9045;

9. Reactivity by U.S. EPA Methods 7.3.3.2 and 7.3.4.1;

10. Herbicides by U.S. EPA Method 8151A; and

11. Pesticides by U.S. EPA Method 8081B.

Clean Soils

Apparent "clean soils" or "native soils" are anticipated to be accepted by MEDEP for "unrestricted use" only if the laboratory analytical results indicate that all COCs do not exceed their respective MEDEP "Residential", "Leaching to Groundwater" and/or "Undeveloped Maine Background" RAGs.

Petroleum- and/or CVOC-Impacted Soils

Petroleum- and/or CVOC-impacted soils are anticipated to be transported off-site to a licensed landfill and/or asphalt batch plant facility if the COCs do not exceed their respective threshold levels, which are designated by the licensure requirements of the landfill and/or asphalt batch plant. Additionally, these petroleum- and/or CVOC-impacted soils shall be transported and disposed off-site in accordance with MEDEP's Solid Waste regulations with prior notification and expressed written approval from the MEDEP.

Please note that the licensure requirements of the landfill and/or asphalt batch plant facility may also require Toxicity Characteristic Leaching Procedure (TCLP) testing for any contaminants that exceed their TCLP "trigger" concentrations. Therefore, if any contaminants are detected at concentrations above their respective TCLP "trigger" levels, the qualified environmental professional should be contacted to determine what additional TCLP analytical testing may be required by the landfill and/or asphalt batch plant facility.

5.11 Groundwater Management

No evidence of contaminated groundwater has been reported at the Site. If contaminated groundwater is encountered that requires dewatering, work should be halted and MEDEP should be contacted immediately in order to facilitate proper dewatering management of potentially contaminated groundwater. The following are scenarios that are listed in order on how contractor(s) should likely proceed with managing dewatering of contaminated groundwater in order to save overall project costs and prevent delays:

1. **Scenario #1 (preferred-case, when possible):** on-Site infiltration to the subsurface with oversight/guidance provided by an environmental professional;

2. **Scenario #2:** treat the contaminated groundwater on-Site and discharge the treated water to the municipal sanitary sewer system, if approved by the City of Portland;

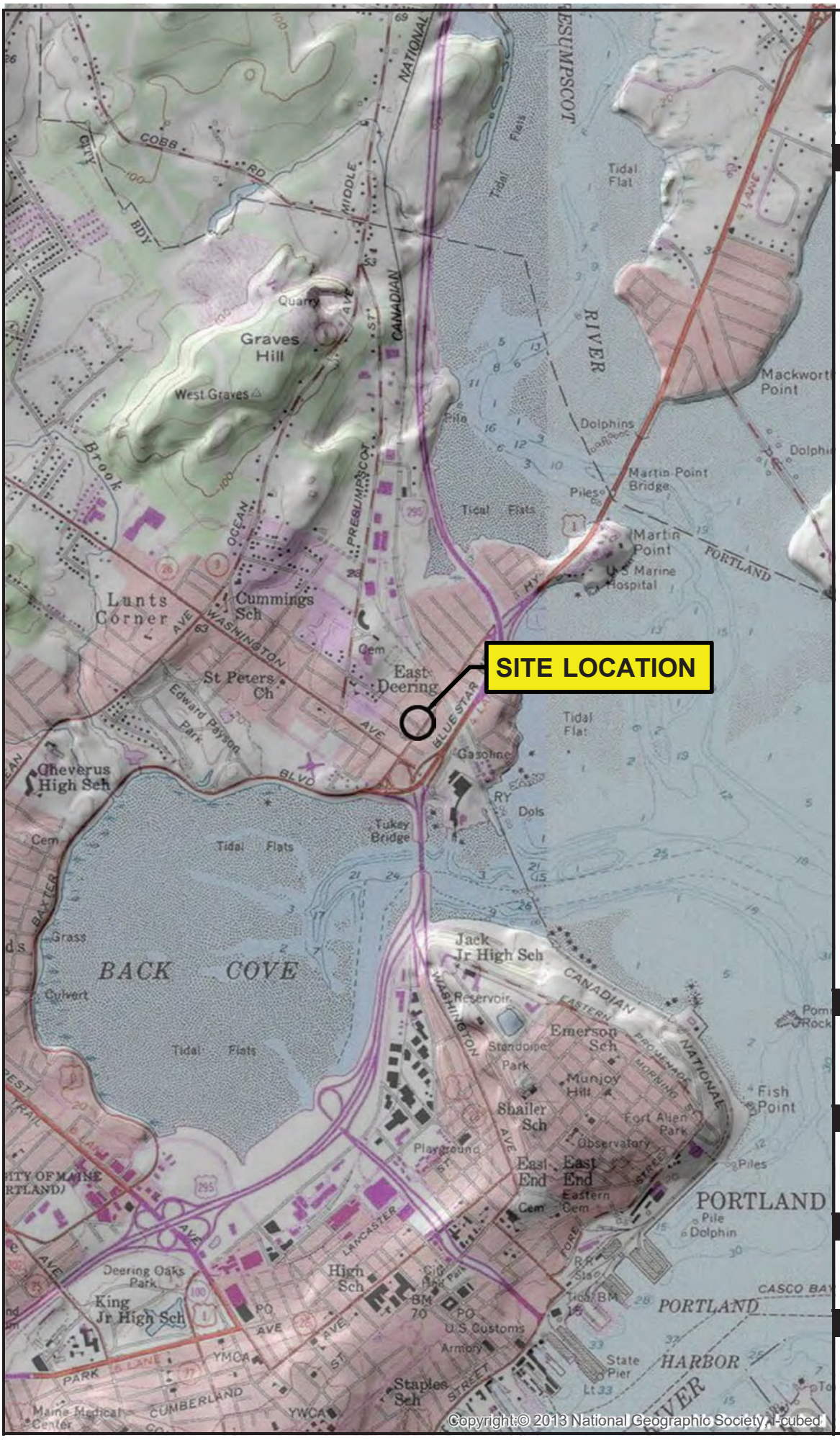
3. **Scenario #3:** Notice of Intent (NOI) may be submitted to the MEDEP, requesting permission to treat the contaminated groundwater on-Site and discharge the water to the municipal storm sewer system; or

4. **Scenario #4:** temporary storage of contaminated groundwater in a fractionation tank and off-Site transport under a Uniform Hazardous Waste Manifest.

5.12 Documentation of Site Activities

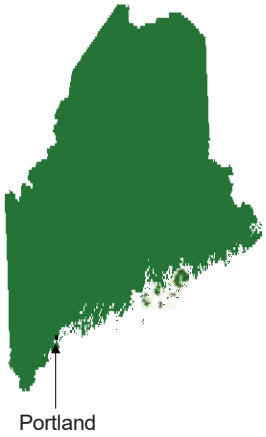
Work conducted on-Site should be coordinated and documented through a designated contractor, employee, or assignee responsible for the implementation of the requirements of this Soil Management Plan (including all health and safety procedures).

Any modifications to this Soil Management Plan require written approval from MEDEP VRAP.



RANSOM
Consulting Engineers and Scientists

Regional Locator Map



Notes

1. Data Source: USGS National Map Seamless Server, 24K DRG, 1/3" NED
2. USGS Quad Name: Portland-East
3. Latitude: 43° 40' 54" N
   Longitude: 70° 15' 23" W
   UTM Northing: 4837283 mN
   UTM Easting: 398732 mE

Scale and Orientation

0 1,000 2,000
1 inch = 2,000 feet

Prepared For

Htmiscellaneous One, LLC
9 Adams Street
Peaks Island, Maine

Site Address

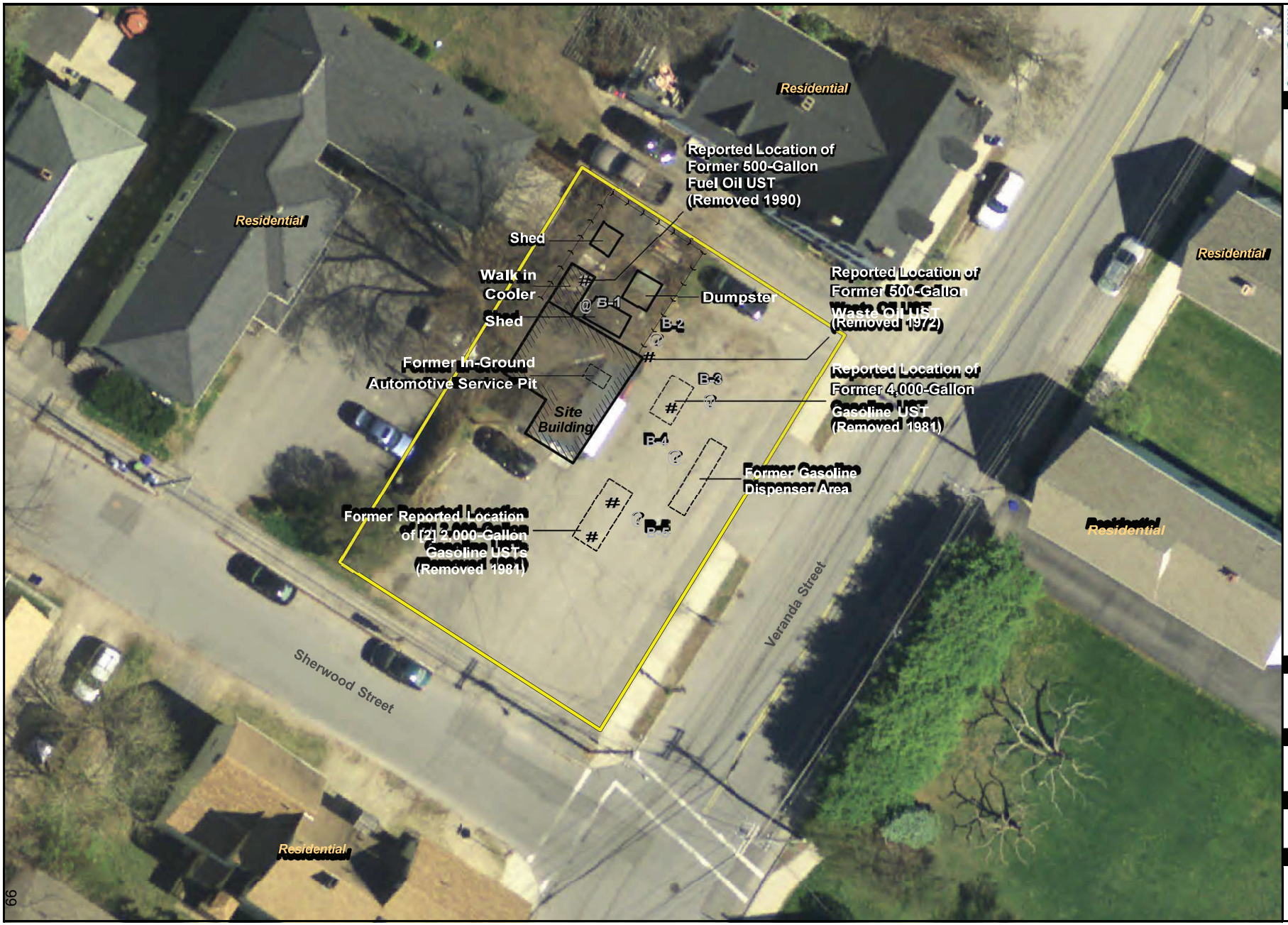
46 Veranda Street
Portland, Maine

151.06124 | Feb 2016

Figure 1

Site Location

G:\Data\ME\Project\151_06124\Maps\Figure_1.mxd



RANSOM
Consulting Engineers and Scientists

Legend & Notes

- Site Boundary
- Former Soil Boring (Jetline 1990)
- # Former UST
- Fence

Notes

1. Site Plan based on Maine GeoLibrary Orthophotography
2. Some features are approximate in location and scale
3. This plan has been prepared for the Htmiscellaneous One, LLC. All other uses are not authorized unless written permission is obtained from Ransom Consulting, Inc.

Scale & Orientation

0 10 20
1 inch = 20 feet

Prepared For

Htmiscellaneous One, LLC
9 Adams Street
Peaks Island, Maine

Site Address

46 Veranda Street
Portland, Maine

151.06124 | Feb 2016

Figure 2
Site Plan

G:\Data\ME\Project\151_06124\Maps\Figure_2.mxd

APPENDIX A

Maine Department of Environmental Protection's
(MEDEP's) Standard Operating Procedure (SOP)
TS004- *Compendium of Field Testing of Soil Samples for Gasoline and Fuel Oil*

Soil Management Plan
Former Colonial Beacon Oil
46 Veranda Street
Portland, Maine

COVERSHEET
STANDARD OPERATING PROCEDURE

Operation Title: Compendium of Field Testing of Soil Samples for Gasoline and Fuel Oil

Originator Name(s): Fred Lavallee, Rob Peale and Troy Smith, Division of Technical Services, Bureau of Remediation & Waste Management

APPROVALS:

Bureau Director:

C. Oft.,..
Print Name

Signature

Date: / 0 2 -z_,--1 L-

Quality Assurance Manager:

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Date: I0·-·2'1-I 2..

Commissioner:

Print Name

Signature

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COVERSHEET
STANDARD OPERATING PROCEDURE

Operation Title: COMPENDIUM OF FIELD TESTING of SOIL SAMPLES for GASOLINE and FUEL OIL

Originators: Fred Lavallee, Rob Peale, Troy Smith and Deb Stahler
Division of Technical Services
Bureau of Remediation and Waste Management
Department of Environmental Protection

Revision Editors: Fred Lavallee, Rob Peale, and Troy Smith
Division of Technical Services
Bureau of Remediation and Waste Management
Department of Environmental Protection

Standard Operating Procedure: TS004
REVISION: 2.1
DATE: October 15, 2012

George eel
Oil Program Manager

Signature

10/22/12
Date

Definition of Acronyms

Acronym	Definition
AOC	Area of Concern
AST	Aboveground Storage Tank
BRWM	Bureau of Remediation and Waste Management
CSM	Conceptual Site Model
CSS	Confirmation Screening Sample
DQO	Data Quality Objective
DR	Division of Remediation
EDD	Electronic Data Deliverable
EGAD	Environmental and Geographic Analysis Database
EPS	Expanded Polystyrene
ESA	Environmental Site Assessment
ESS	Excavation Screening Sample
FGS	Feet below Ground Surface
GW	Groundwater
LS	Laboratory Sample
LUST	Leaking Underground Storage Tank
^{o}F	Degrees Fahrenheit
PID	Photo Ionization Detector
PPM	Parts Per Million
PPMV	Parts Per Million by Volume
QAP	Quality Assurance Plan
RAG	Remedial Action Guideline
REC	Recognized Environmental Condition
RS	Response Services
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
TS	Technical Services
UST	Underground Storage Tank

1.0 PURPOSE

The purpose of this document is to describe the Maine Department of Environmental Protection, Bureau of Remediation and Waste Management (BRWM) procedure for petroleum field testing of soils.

2.0 APPLICABILITY

BRWM is responsible for the investigation and remediation of petroleum sites throughout Maine. The procedures described herein are field tests for (1) determining relative levels of gasoline present in soil with a PID instrument and (2) screening soils contaminated with kerosene and fuel oil using an oleophilic dye test. Under certain conditions where soil contact scenarios focus on the excavation-construction worker exposure scenario below two feet, a third screening technique identified as the Water Shake Test can be used as an acceptable substitute for the PID and Oleophilic Dye Test as explained below.

The **PID Bag Headspace Test** is applicable only for soils contaminated with gasoline. It is not applicable for heavier petroleum products such as kerosene or fuel oil.

The **Oleophilic Dye Test** is applicable for fuel oils. It is not applicable for use with heavy crude oils (Bunker C) or bituminous materials like asphalt or waxes. Mineral oil and motor oils may be detected; however, the detergents in some synthetic motor oils may interfere with color development.

Both tests are needed to screen soils for gasoline and fuel oils at sites contaminated with mixed or unknown petroleum products.

When these procedures are strictly followed results may be used to make key field decisions and provide information for site assessments.

The **Water Shake Test** is applicable only when leaching to groundwater is NOT a risk pathway of concern, the direct contact risk is limited to the excavation construction worker, and the soils are deeper than two-feet below the land surface. Under these conditions the Water Shake Test can replace the PID Bag Headspace Test and the Oleophilic Dye Test methods.

3.0 RESPONSIBILITES

All staff must be appropriately trained prior to performing these tests for the investigation of petroleum sites and that training must be documented in accordance with the LUST QAP (http://www.maine.gov/dep/spills/petroleum/lustqaplan.html). Generally, it is the field personnel of (BRWM/Technical Services (BRWM/TS), BRWM/Response Services (BRWM/RS) and BRWM/Remediation (BRWM/DR) who will be responsible for performing the tests. The directors of the Divisions of Response Services, Technical Services and Remediation as well as all supervisors in those divisions are responsible for ensuring that staff understand and adhere to these procedures when used for key field decisions or site assessments.

4.0 INTRODUCTION

This SOP includes three field tests for petroleum along with guidance for their application for site work.

For the **PID Bag Headspace Test**, a soil sample is placed in an approved container and the volatile constituents are allowed to come to equilibrium. The headspace is then measured with an isobutylene calibrated PID, with a result expressed in parts per million by volume (PPMV).

For the **Oleophilic Dye Test**, soil is added to the sample bottle, to which oil-free water is also added and the contents shaken vigorously with a rapidly dissolving red or blue oleophilic dye.

The oleophilic dye stains petroleum products red (or blue). When petroleum is released from the soil it attaches to an expandable polystyrene (EPS) bead and/or attaches to the walls of the container. Where no visible oil layer is present the bead will turn pink or blue down to the limit of detection which is about 500 ppm.

For the **Water Shake Test** soil and water are added to a clear glass container, shaken, and the presence of free petroleum blebs or a petroleum layer can be seen.

5.0 PLANNING

As with any sampling event, a sampling and analysis plan (SAP) and a health and safety plan (HASP) should be developed. Guidance for the development of a Sampling and Analysis Plan can be found in DR SOP #014 – Development of a Sampling and Analysis Plan (http://www.maine.gov/dep/spills/publications/sops/index.html).

Processing one headspace sample will take up to 30 minutes from initial sample collection through recording results. It is important to plan for someone to complete the sampling and analysis in a careful and timely fashion for results to be useful. For some projects more than one field person may be needed.

6.0 EQUIPMENT

6.1 The following equipment is required for conducting the PID Bag Headspace Test for gasoline:

- Soil sampling equipment such as shovel, bucket auger, soil borer, scoops; 200g container (6 ounce can), 20g and 5g soil coring devices.
- Approved containers: Bags are made from a double layer of strong metalized polyester and low-density polyethylene (3 mil) with dimensions: 8-1/2" x 12" stand-up zipper pouch with 3-1/2" bottom gusset.

  *Note: Associated Bag Company Item Number 183-52 meets these requirements. Other products may be acceptable. Standard re-sealable plastic bags such as sandwich or freezer bags are **not** acceptable because they do not adequately prevent the loss of gasoline vapors.*
- An approved PID with a lamp energy of 10.2 to 10.6 eV; and
- Calibration equipment, including users' manual, for particular PID to be used.

6.2. The following equipment is required for conducting the Oleophilic Dye Test for fuel oils:

- Soil sampling equipment such as shovel, bucket auger, soil borer, scoops;
- 50 ml plastic sample bottles containing appropriate dyes and EPS bead. Kits from two commercial test kit companies, Oil-In-Soil and OilScreenSoil have been successfully tested

by MEDEP for use according to this SOP. Red dyes are preferred, but Indigo Blue kits are available for use when soil color interferes with interpretation of red dye test kits; and

- Oil-free water

6.3. The following equipment is required for conducting the Water Shake Test:

- Clear container with cover; and
- Oil free water.

7.0 PROCEDURE for PID BAG HEADSPACE

7.1. Instructions for use of a PID can be found in Division of Remediation SOP DR#019 – Protocol for Use of a PID/FID (http://www.maine.gov/dep/spills/publications/sops/index.html). It is recommended that the operator that will be conducting this procedure take the time before the sampling event to familiarize themselves with the particular instrument that will be used, if they are not already familiar with that instrument. This includes reviewing the specific user manual, and calibration and practice with the instrument prior to the sampling event.

7.2. The PID must be bump tested prior to each use, at least every two hours during use, and at the end of the day. If the bump test falls outside 100±10 PPM, the lamp should be cleaned and the filter changed. If repeat bump testing remains outside 100±10 PPM the instrument should be re-calibrated. Record all bump test results. The PID must be calibrated to isobutylene according to manufacturer instructions. Check the calibration ("bump test") against the 100 PPM isobutylene standard and record the results.

Note: No calibration adjustment or correction of instrument readings is made for set points; the response factor should be 1.0 for all instruments.

7.3. Evaluate PID high concentration performance before arriving at the site each day of use. This can be accomplished by measuring the headspace over pure acetone or other suitable substance that normally produces values higher than the Outdoor Commercial Worker/ Excavation-Construction Worker screening number from Table 1. The PID must not be used for site work if performance does not meet the expectation.

7.4. Collect the soil sample with appropriate soil sampling equipment, as outlined in the site specific Sampling and Analysis Plan (SAP)(See SOP DR#014 - Development of a Sampling and Analysis Plan) or the applicable Appendix to this SOP.

- Do test in triplicate (at a minimum), taking co-located samples. True replicates are difficult to collect. It is important to collect at least three samples when using the results to make key field decisions.
- Label and open the bags. Unfold the bottom gusset in each bag to facilitate a uniform headspace volume when the bags are closed. This is particularly important for smaller sample sizes.
- Place appropriate mass of soil in aluminized bag.
    - For Leaching to Groundwater cleanup scenarios use 200 g soil (6 oz can)
    - For Resident or Park User cleanup without regard to groundwater use 20 g soil (20 ml syringe or plug sampler)
    - For Outdoor Commercial Worker/ Excavation-Construction Worker cleanup scenarios use 5 g soil (5 ml syringe or plug sampler)

- Close bag leaving uniform headspace.
- Knead samples (in closed bag) if needed to break up clumps, then shake bags for 30 seconds.
- Thaw sample if frozen.
- Let stand for 10 minutes to develop headspace.
- Knead/shake bags for additional 30 seconds.
- Let stand for 2 minutes. Do not let samples stand for more than a total of 30 minutes before PID measurement. Gasoline vapors can migrate through bags. Testing indicates up to 20% loss after sitting for 60 minutes at 70°F in the metalized bags.
- Open bag carefully and insert probe of calibrated PID one third to half way into bag (approximately 4 inches). Keep bag seal closed as much as possible around probe.
- Allow instrument to read until concentrations start to fall.
- Record highest sustained reading.
- Repeat for additional bags.

7.5. Result Interpretation

- Table 1 presents field cleanup guidelines for the various exposure scenarios. Values in Table 1 are dependent on sample size and PID model. Only approved PID models may be used. Remediation is indicated if the average sample result is at or above the Table 1 value for the site's cleanup scenario.
- Excavation Screening Samples (ESS) and other samples where only one bag per sample is tested: compare results to Table 1 values.
- Confirmation Screening Samples (CSS) and other samples where more than one bag per sample is tested: Average the three (or more) sample results and compare to Table 1 values.
- Alternatively, a PID can be calibrated to a gasoline contaminated site if sufficient laboratory MA VPH sample data are available for comparison. Any alternative calibration must follow a Department approved plan.

8.0 PROCEDURE FOR FUEL OIL OLEOPHILIC DYE TEST

8.1 Collect the soil sample with appropriate soil sampling equipment, as outlined in the site specific Sampling and Analysis Plan (SAP)(See SOP DR#014 - Development of a Sampling and Analysis Plan) or the applicable Appendix to this SOP.

8.2 Perform test as follows:

- Add soil to sample bottle (50 ml plastic sample bottles containing appropriate dyes and EPS bead) according to manufacturer's instructions;
- Label bottle;
- Add oil free water to sample bottle according to manufacturer's instructions;
- Shake vigorously until dye cube dissolves (about 30 seconds);
- Allow sample to sit for 10 minutes for color development on bead;
- Use indigo blue dye when results are inconclusive with red dye.

8.3 Results are reported as saturated, positive, slightly positive and undetected as described below:

- **Saturated** when obvious red (or blue) dye is observed in the soil matrix, or in/on the water (may stain the side of the jar);
- **Positive** when only the EPS bead is dyed dark pink/ red or blue and there is no coloration in the soil or water;
- **Slightly Positive** when only the EPS bead is dyed light pink or blue and there is no coloration in the soil or water; or
- **Undetected** when there is no coloration in the soil or water and the EPS bead remains white.

8.4 Results are interpreted as described below:

- **Undetected** result indicates no cleanup is required unless laboratory results indicate an exceedance of a leaching to groundwater exposure criteria.
- **Positive/ Slightly Positive** result indicates cleanup is needed for leaching to groundwater, excavations less than 200 cubic yards, and resident/park user scenarios.
- **Saturated** results indicate cleanup is needed for leaching to groundwater, resident/park user and outdoor commercial/ excavation-construction worker scenarios.

Note: Testing performed to date indicates that an Undetected result will be protective of leaching to groundwater in most cases. Laboratory analyses may be needed to ensure all guidelines are met. The Department will continue to collect and review results to evaluate whether or not this test may be used to determine when cleanup is needed for leaching to groundwater scenarios.

9.0 PROCEDURE FOR WATER SHAKE TEST

9.1 Collect the soil sample with appropriate soil sampling equipment, as outlined in the site specific Sampling and Analysis Plan (SAP)(See SOP DR#014 - Development of a Sampling and Analysis Plan) or the applicable Appendix to this SOP.

9.2 Perform test as follows:

- Add soil to clear glass container, approximately 1/3 container volume;
- Label bottle;
- Add oil free water to container, to fill approximately 1/2 container volume;
- Shake vigorously for approximately 30 seconds;
- Allow sample to sit for 10 minutes;
- Make observation of any NAPL.

9.3 Results are reported as Observed NAPL (ON) or No Observed NAPL (NON)

- **Observed NAPL** when a NAPL layer or blebs is observed on or below the water surface;
- **No Observed NAPL** when no NAPL is present or only a sheen is observed.

9.4 Results are interpreted as described below:

- **Observed NAPL:** oil or gasoline saturated soil is present;
- **No Observed NAPL:** oil or gasoline saturated soil is not present.

Note: The Water Shake Test is only applicable for sites where leaching to groundwater is not a risk pathway of concern, soils are below two-foot depth, and when resident, park user, or commercial worker scenarios are NOT applicable.

10.0 QUALITY ASSURANCE/QUALITY CONTROL

All field tests must be completed and documented according to these written procedures.

Samples will be collected in accordance with a site specific sampling plan or as outlined in the applicable appendix to this SOP.

PID calibration must be checked at the beginning and end of each day and every two hours while testing is performed. Results must be 100±10 PPM for initial calibration check. If the initial check falls outside 100±10 PPM, the lamp should be cleaned and the filter changed. If repeat bump testing remains outside 100±10 PPM the PID should be recalibrated. All recalibration and calibration checks (bump tests) must be documented on the field sheet or in the field notebook.

PID high concentration performance must be evaluated and documented before each day of use, as described in Section 7.3.

All PID Bag Headspace samples used for key field decisions or assessments performed for compliance to Chapter 691 rules must be taken in triplicate (at a minimum).

Quality control samples will be taken in accordance with the LUST QAP.

Additional quality assurance/quality control tasks may be needed based on the DQO requirements of the project.

11.0 DOCUMENTATION

Field notes should be collected following the standard procedures as outlined in 6.0 of the LUST QAP. When documenting such a sampling event, one should include enough information so that a person at a later date can easily duplicate the sampling and be able to compare the results. Any deviations from these procedures must be documented.

Record results for the PID bag headspace test on the form provided in Attachment 1. Results may alternatively be recorded in the field notebook as long as all information from Attachment 1 is recorded. Additionally, some PIDs have software which can record data. Any special method of recording and documenting results must be outlined in the SAP.

Record results for the oleophilic dye test and/or water shake test on the form provided in Attachment 2. Results may alternatively be recorded in the field notebook as long as all information from Attachment 2 is recorded.

Results for CSS with corresponding laboratory analysis should be submitted to the Department in the Maine DEP electronic data deliverable [EDD] format. Excel spreadsheets (http://www.maine.gov/dep/spills/petroleum/documents/sop/EDD_Oil_Field_Sheets.xls) for use specifically with these field tests as well as laboratory EDD spreadsheets (http://www.maine.gov/dep/maps-data/egad/index.html) are available from Maine DEP. The Excel spreadsheets for these field tests follow the format of Attachment 1 and Attachment 2. Note: Submission of EDD should not include ESS field screening results.

Only CSS with the corresponding laboratory results should be submitted for uploading to the Environmental and Geographic Analysis Database [EGAD].

Table 1: Approved PID Field Cleanup and Notification Guidelines

Cleanup Scenario	Soil size [grams]	Ion	Thermo	Passport	Foxboro	MiniRAE	Photon
Leaching to GW/ Notification	200	80	60	60	50	40	40
Resident/ Park User	20	700	275	500	250	350	300
Outdoor Commercial Worker/ Excavation-Construction Worker	5	1200	500	850	375	1500	400

Note: No adjustment is made for set points; the response factor should be 1.0 for all instruments.

Instrument Descriptions

Ion: Ion Science PhoCheck Series

Thermo: Thermo Environmental OVM 580 Series

Passport: MSA Passport PID II OVM

Foxboro PID: Foxboro TVA-1000 PID mode

MiniRAE: RAE Systems MiniRAE 2000 and MiniRAE 3000

Photon: MSA Photon Gas Detector

111

TS004 Bag Headspace Field EDD Sheet												
Site Name:								Spill #				
Town:								Sampler:				
Air Temperature:		Date:						Sample Method				
Calibration Gas Concentration:								Soil Heating Method:				
Confirm high end measurement:								PID Instrument:				
Calibration Documentation				**Bump Test Documentation**				Weather:				
Time 1:		Reading 1:		Time 1:		Reading 1						
Time 2:		Reading 2:		Time 2:		Reading 2						
Time 3:		Reading 3:		Time 3:		Reading 3						

Calibration Documentation readings above should be post-calibration readings

Sample ID	Depth [FGS]	Sample Size	Collection Time	Analysis Time	Bag-1	Bag-2	Bag-3	Average	Soil Type	CSS Location	Comments

112

TS004 Oil Shake Test Field/Water Shake Test Field EDD Sheet					
Site Name:				Town:	
Date:			Sample Method:		
Spill #				Sampler:	
Ambient Temperature:				Weather:	
Sample ID	Depth [FGS]	Result	Soil Type	CSS Location	Comments

SA = Saturated- obvious red (or blue) dye is observed in the soil matrix, or in/on the water (may stain the side of the jar)
PO = Positive- the EPS bead is dyed dark pink/ red or blue and there is no coloration in the soil or water
SP = Slightly Positive- the EPS bead is dyed light pink or blue and there is no coloration in the soil or water
U = Undetected - No observations of dye coloration on EPS bead, soil, or water
NON = No Observed NAPL for Water Shake Test
ON = Observed NAPL for Water Shake Test

Field Sampling Procedure for Excavations

Appendix A is to be used at soil removals and excavations where the data quality objective is to meet the Soil Exposure Guidelines in Section 5 of the Remediation Guidelines for Petroleum Contaminated Sites in Maine. Appendix A is not intended for remediating releases under Section 3 of the Remediation Guidelines for Petroleum Contaminated Sites in Maine. The basis of this procedure is that field samples will be used to direct soil excavation and confirm that field screening objectives are met prior to terminating the excavation and collecting laboratory samples. The following procedure should be followed when the objective is to determine excavation limits based on field screening. The following procedure is not intended to override the Conceptual Site Model (CSM) or other site specific objectives for the removal action. If termination of the excavation is not based on field screening procedures, then the reasons should be clearly presented in post removal documentation. A site specific sampling plan that differs from this procedure may be applied if approved in advance by the Department.

This procedure uses three types of samples as defined below. The sample type definitions are provided to help clarify what is meant by terms used in this document.

Excavation Screening Samples (ESS). Use ESS to define soils to be removed. These are field screened samples generally collected to help direct the soil excavation (see Appendices B and C for other uses). These samples may represent soils that are removed during an excavation because they exceed the field screening guidelines, or they may represent soils that remain in place. Triplicate sampling is not required for PID Bag Headspace test of ESS for this application. Documentation of the ESS is at the discretion of the Environmental Professional completing the sampling.

Confirmation Screening Samples (CSS). CSS should identify areas of the excavation where cleanup objectives have been reached or where site limitations prevent further excavation. These field screened samples should represent worst case contaminated soils, if still present, that remain in place. Triplicate samples are required for Bag Headspace test of CSS. CSS must be documented and include all information presented in Attachment B.

Laboratory Samples (LS). These are lab samples that are collected at the termination of the excavation and represent worst case contaminated soils, if still present, that remain in place. They are collected at a rate of 1 - LS per 10 - CSS. Please remember, you can collect as many excavation screening samples as you need to help direct the excavation without collecting any LS. However, once you have reached the limits of the excavation and CSS are collected, then a minimum of one LS will be collected for each ten CSS collected. The LS should be co-located with the corresponding CSS location or locations, and should be collected where the most contaminated soil was present during the excavation process.

CONCEPTUAL SITE MODEL [CSM]

The Appendix A procedure is intended to fit within the context of the CSM when the objective for the site is to complete an excavation based on field screening methods described in this SOP. In cases where the CSM justifies variation from the procedure outlined in Appendix A, the CSM must be presented in written form and included in the post removal document that is available for future investigators. The CSM should also be included in the site specific sampling plan submitted for Department approval when variation from the Appendix A procedure is appropriate. The CSM must include a concise explanation of the sources present at the site and on adjoining properties (surface spill, AST, UST, product piping, loading rack, and fuel dispensers); receptors (on-site and off-site); and the risk scenario (Leaching to Groundwater,

Resident/Park User, Outdoor Commercial Worker/Excavation-Construction Worker). Keep in mind that the risk scenario may change if contamination extends onto an adjoining property.

SAMPLING STRATEGIES

During the soil removal various sampling strategies can be utilized to expedite decision making. For example, a large sample (full bag) can be collected from the excavation and brought to a work table for processing. For gasoline contaminated sites, an initial PID screening of the soil (quick bag headspace with a 1-minute headspace equilibration) can be done to determine the relative concentration of gasoline contamination that is present. If the initial screening shows that results are above the termination criteria then no further processing may be necessary and the soil in the bag can be placed in a truck for disposal. If the initial screening determines that the concentrations may be near the termination criteria, then triplicate samples can be prepared. This sampling strategy requires quick processing and handling. Triplicate samples should be prepared within a few minutes of collecting the large sample volume from the excavation.

SAMPLE FREQUENCY

Excavation Screening Sampling (ESS)

The sampling frequency and documentation of ESS is up to the discretion of the environmental professional responsible for directing the excavation. Once the environmental professional determines that sufficient soils have been removed, CSS should be collected to document the decision to terminate excavation.

Confirmation Screening Samples (CSS)

The collection of CSS is separated into specified depth intervals to account for direct contact risks and risks associated with contaminant migration (oil saturated soils, free-product, or leachable to groundwater). The specified depth intervals are based on the definitions of *Accessible, Potentially Accessible,* and *Isolated Soil* included in The Maine Remedial Action Guidelines (RAGs) for Soil Contaminated with Hazardous Substances. The top two feet is defined as *accessible soil* and represents that greatest potential for direct contact and ingestion risk. Therefore, samples are required for determining the risks in the upper two feet. Below two feet the soils are considered *potentially accessible* to a depth of 15-feet unless the soils are covered by a building or other permanent structure that does not have earthen floors. Below 15-feet the soils are considered *isolated* for contact risk, but may represent a groundwater leaching pathway.

Lab Samples (LS)

LS frequency is set at 10% of total CSS analyzed for the excavation. LS should be co-located with a CSS and documentation of the co-located samples should be clear for future investigators.

MINIMUM SAMPLE LOCATIONS

Excavation Wall Sampling

Top Two Feet of Excavation

A minimum of one CSS is required in the top two feet for each twenty-foot section of excavation exposure. The excavation exposure is the total perimeter distance of the excavation.

Two to Fifteen Feet of Excavation Depth

A minimum of one CSS is required for each twenty linear feet of excavation perimeter.

Greater than Fifteen Feet of Excavation Depth

A minimum of one CSS is required for each additional ten feet of depth by 20 linear feet of excavation perimeter.

Floor Sampling

On the floor, a minimum of one CSS sample shall be collected for each 100-square feet of floor exposure (10 x 10). Keep in mind that due to side wall sloping, the floor exposure is likely to be smaller than the foot print of the excavation.

EXAMPLE

An excavation oriented north-south that is 50-feet long, 50-feet wide, and 15-feet deep represents a removal of approximately 1,400 cubic yards (Figure 1). The perimeter measures 200-feet and the walls are vertical to keep things simple. This excavation would require a minimum of 45 CSS locations as shown below. The 45 CSS included: ten CSSs from 0-2 feet, ten samples from 2-15 feet, and 25 samples from the floor. This example would require a minimum of 5 LS.

Sampling Plan for 50’L x 50’W x 15’D Excavation

North Wall: 50-feet long, 15 feet deep

	5	10	15	20	25	30	35	40	45	50
1										
2	Sample 1				Sample 2				Sample 3	
3										
4										
5										
6										
7										
8										
9	Sample 4				Sample 5				Sample 6	
10										
11										
12										
13										
14										
15										

East Wall 50 feet long, 15 feet deep

	55	60	65	70	75	80	85	90	95	100
1										
2	Sample 3			Sample 7				Sample 8		
3										
4										
5										
6										
7										
8										
9	Sample 6			Sample 9				Sample10		
10										
11										
12										
13										
14										
15										

South Wall: 50-feet long, 15 feet deep

	105	110	115	120	125	130	135	140	145	150
1	Sample 11				Sample12				Sample13	
2										
3	Sample 14				Sample 15				Sample16	
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

West Wall 50 feet long, 15 feet deep

	155	160	165	170	175	180	185	190	195	200
1	Sample 13		Sample 17				Sample 18			
2										
3	Sample 16		Sample 19				Sample 20			
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

Floor Of Excavation is 50-feet long and 50-feet wide

	5	10	15	20	25	30	35	40	45	50
5	Sample 21		Sample 22		Sample 23		Sample 24		Sample 25	
10										
15	Sample 26		Sample 27		Sample 28		Sample 29		Sample 30	
20										
25	Sample 3		Sample 32		Sample 3		Sample 34		Sample 35	
30										
35	Sample 3		Sample 37		Sample 3		Sample 39		Sample 40	
40										
45	Sample 4		Sample 42		Sample 4		Sample 44		Sample 45	
50										

Field Sampling Procedures for Environmental Site Assessment [ESA] Investigations

1. Introduction

The purpose of this appendix is to provide for application of the field procedures to ESAs, which include Phase II assessments, property transactions, or similar environmental investigations. This procedure focuses on analyzing surface and subsurface soil samples. Sample collection methods may include backhoe/excavator, split spoon, direct push, bucket auger, or hand tools.

Results of the field methods can be used for selecting samples for laboratory analyses, determining if DEP notification levels have been exceeded, and for making risk-based decisions for the site.

In situations where the field methods will be used to make risk-based decisions, a site specific sampling plan must be developed prior to completing the field investigation to assure that the appropriate risk-based criteria and field methods are applied to the site.

This procedure specifies methodologies for field screening to make risk-based decisions and DEP notification determinations. This procedure also specifies methodologies for using field screening to select laboratory samples where decisions are based on the laboratory results and not the field results.

This procedure establishes certain documentation requirements for recording the soil sampling method used to obtain samples.

The method or methods selected for field screening will depend on the scope of the investigation and the contaminants of concern. In general the oleophilic dye test is for determining the presence of petroleum saturated soil or for determining the relative concentration of diesel, fuel oil, or kerosene contamination present. The PID bag headspace test is appropriate to determine the relative concentration of gasoline contamination, and may be useful in detecting the presence of fuel oil or kerosene contamination but it cannot be used to determine the absence of fuel oil or kerosene.

2. Sampling Purpose

DEP staff and other environmental professionals using the field methods must understand the purpose for collecting the samples prior to completing the Environmental Site Assessment (ESA). The purpose for sample collection will determine how to apply the procedures at a specific site. It is strongly recommended that historical research be performed and a sampling plan be developed for all ESAs by a qualified environmental professional.

2.1 Field Screening for Laboratory Analyses

The field procedures may be used to select samples for appropriate laboratory analyses (VOC, SVOC, VPH, EPH, lead, etc.). Under this approach, the procedures will be used to determine the relative presence of VOCs detectable with the selected PID and/or the relative presence of middle distillate SVOCs detectable with the oleophilic dye test. However, risk-based decisions will not be based on the field screening methods. Instead risk-based decisions will be based on the laboratory results. PID bag headspace samples collected for this purpose are not required to be completed in triplicate.

Note: the sample volume used for screening should be based on the linear range of the PID selected. Based on the Department's experience the approximate limit of linearity is 10% higher than the Table 1 Outdoor Commercial Worker/ Excavation-Construction Worker Scenario field cleanup guidelines regardless of sample size.

2.2 Field Screening for DEP Notification

The field procedures may be used to determine if the DEP notification level at petroleum sites has been exceeded. Appendix C discusses the application of the field procedures to the UST Site Assessment process. Section 2.2 applies where the screening is not related to an UST site assessment but the ESA is being completed to determine if DEP notification is warranted. For this purpose, PID bag headspace samples will be collected in metalized bags in triplicate with all three samples targeting the same depth (see sample methodology Section 3 for additional discussion). Sample size will be 200 grams as specified on Table 1, page 8 of the SOP.

2.3 Field Screening for Risk-Based Decisions

The field screening procedures may be used as a basis for making risk-based decisions at petroleum sites. DEP staff and other environmental professionals should determine the appropriate exposure scenario (leaching, resident, park user, commercial, excavation) for the project based on the CSM, the appropriate sample depth criteria (accessible, potentially accessible, and isolated), and the applicability of institutional controls to limit future exposure. Select the appropriate PID bag headspace soil sample size(s) for the project given the above criteria. ESSs (as defined in Appendix A) can be used to determine the distribution of contamination within each separate source area (may also be referred to as an area of concern or recognized environmental condition). PID bag headspace CSSs, collected in triplicate, targeting the appropriate depth (based on the CSM, ESS results and exposure scenario) can be used to make risk-based decisions about gasoline contamination within potentially contaminated areas at the site. LS will be based on the number of CSS (1 LS for every 10 CSS).

3. Sampling Methodology

Documentation of the sampling method used must be included with the data in the ESA report. Excavators, backhoes, and hand tools all have the ability to expose relatively large volumes of soil for direct examination and sample collection. However, subsurface soil borings rely on small sample volumes to represent subsurface conditions. Therefore, different sample methodologies are warranted as presented below.

3.1 Hand Tools, Excavator, Backhoe

Triplicate and co-located samples can be selected with more reliability using direct excavation techniques such as test pits than from soil borings. Therefore, the sampling methodology is the same as presented in Appendix A.

3.2 Subsurface Soil Borings

Due to the limitations in sample recovery and direct observation of the subsurface conditions several soil borings may be required to reliably use the field screening procedures to characterize subsurface conditions. The number of soil borings is site specific and depends on the soils present, the size of the area being investigated and the ability of the equipment to recover representative samples. Sample recoveries less than 60% will require alternative methods to use the field screening techniques for making risk-based decisions. Alternative sampling methods may include shortening the sample length to increase soil recovery in a target interval. For example where a 4 foot core barrel is in use, it could be driven and recovered twice to collect 2 two-foot samples over a four-foot interval. Depending on the soil type, this may result in better sample retrieval than attempting to sample all four feet in one run. Another alternative method may include completing multiple borings at a specific location to adequately sample the subsurface when soil recoveries are below 60%. When risk-based decisions or notification level determinations are being based on field methods and soil borings, a minimum of one ESS should be collected for every two feet of boring depth. If significant

changes in contaminant concentrations or geologic characteristics are observed over a sampled interval then they should be sampled (field screened) separately. In addition a minimum of one CSS should be collected for each risk-based depth criteria (accessible, potentially accessible, and isolated) in accordance with Appendix A. Lastly at least one boring must be sampled as a CSS per each 500 square feet of potentially contaminated area (AOC, REC, or source area).

4. Documentation

The method of soil sample collection must be documented. Where subsurface soil samples are described on a log (test pit log or boring log) the information must be recorded in a way that documents the stratigraphy and the specific characteristics of the soil sample. For boring logs, the depth interval sampled must be recorded. Additionally, the sample recovery details must be documented, including either the percentage of the target interval actually recovered, or the length of recovery compared to the target length. Collapsed soils recovered in the sample interval must not be included in the percent recovered or in the length of sample recovered. This is often referred to as “wash” from wash and drive drilling methods. Direct push tools that do not utilize dual tube samplers may also experience collapse from coarse grained units.

Field Sampling Procedures for UST Site Assessments at Facility Closure or Tank Abandonment

1.0 Introduction

This section applies to Appendix P of Chapter 691, the Department's Rules for Underground Oil Storage Facilities. Notification levels for the PID Bag Headspace test are given in Table 1 of the SOP. Notification for the Oleophillic Dye Test is any coloration on the ESP bead or if dye is observed in the soil matrix, in/on the water, or staining the side of the jar.

2.0 Underground Piping and Dispenser Island areas

For the purpose of this Appendix, a piping run and associated dispenser(s) island is treated as one area. One ESS is required for each 5-foot section of underground piping, including the associated piping dispenser island. One CSS is required at all ESS locations that exceed the DEP Notification Level specified in this SOP. If no ESS exceeds the notification level, then the three highest ESS readings shall be selected for CSS collection. One LS shall be required for each 10 CSS collected within each underground piping and dispenser area.

3.0 Underground Storage Tank Area

More than one UST may be removed during a tank removal event. If the tanks are located adjacent to one another and the resulting excavation is one continuous excavation, then it can be considered one tank area. If the USTs are not adjacent to one another and the resulting tank excavations have separate excavation side walls, then they shall be treated as separate tank areas.

3.1 Excavation Screening Sampling (ESS)

The ESS are to be collected in accordance with Appendix A in a metalized bag and follow the procedures outlined in this SOP.

3.2 Confirmation Screening Samples (CSS)

CSS are to be collected in accordance with Appendix A. For the tank facility where the tank is to be replaced in the same location, and the surface will be paved, CSS in the top two feet of the tank excavation is not required.

NOTE: The basis for this exclusion is that soil in the upper two feet of a tank excavation is seldom contaminated. CSS are to be taken from the piping runs (including any piping run above the tank footprint) and dispenser island in accordance with Section 2.0 of this Appendix, even when the tank will be replaced and the surface paved.

3.3 Lab Samples (LS)

LS are to be collected in accordance with Appendix A.

APPENDIX B

Environmental Media
Management Plan Rev 1
The Roux Institute at
Northeastern University
1 Beanpot Circle, Portland, ME

ENVIRONMENTAL MEDIA MANAGEMENT PLAN REV 1

The Roux Institute at Northeastern University
Portland, Maine

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0233482.00
Initiative for Digital Engineering and Life Sciences (IDEALS)
April 24, 2024[124]

TABLE OF CONTENTS

SECTION **PAGE NO.**

1. INTRODUCTION 1-1

1.1 Purpose 1-1
1.2 Site History 1-1
1.3 Previous Subsurface Investigations and Remedial Activities 1-2
1.3.1 UST Removal Site Assessment – 1995 1-2
1.3.2 Subsurface Site Investigation – 2021 1-2
1.3.3 Subsurface Site Investigation – 2022 1-3
1.3.4 Limited Soil Sampling During Demolition – 2023 1-4
1.3.5 Subsurface Site Investigation – 2024 1-4
1.4 Summary of Expected Site Conditions 1-5

2. RESPONSIBILITIES 2-7

3. GENERAL HEALTH & SAFETY RECOMMENDATIONS 3-1

3.1 Personal Protective Equipment 3-1
3.2 Training Requirements 3-2
3.3 Hazard Communication 3-2

4. ENVIRONMENTAL MEDIA MANAGEMENT PLAN 4-1

4.1 Overview 4-1
4.2 Initiation of Work Activities 4-2
4.2.1 Potential Permits Required for Soil Excavation 4-2
4.2.2 Site Access Control 4-2
4.2.3 Temporary Facilities/Utilities 4-2
4.3 Construction Soil Management Controls 4-2
4.3.1 Dust Control 4-2
4.3.2 Track-out Controls 4-2
4.3.3 Stockpile Management 4-3
4.3.4 Erosion Control 4-3
4.4 Soil Excavation Monitoring 4-3
4.5 Soil Characterization 4-4
4.5.1 Soil Categories 4-4
4.5.2 Waste Characterization 4-5
4.5.2.1 Previously Completed Waste Characterization 4-5
4.5.2.2 Supplemental Waste Characterization 4-6
4.6 Soil Reuse and Disposal 4-6
4.6.1 Onsite Reuse 4-6
4.6.2 Offsite Reuse 4-7
4.6.3 Offsite Disposal 4-7
4.6.4 Offsite Disposal of Hazardous Waste 4-8
4.6.5 Offsite Soil Transport and Documentation 4-8
4.6.6 Verification / Confirmatory Soil Sampling 4-8
4.7 Dewatering / Groundwater Management 4-8
4.8 Decontamination Procedures 4-9
4.9 Recordkeeping and Reporting 4-9

5. REFERENCES 5-1

TABLES

Table 1: Detected Groundwater Analytical Results (embedded)
Table 2: Summary of Detected Soil Analytical Results
Table 3: Recommended PPE Summary (embedded)

FIGURES

Figure 1: Site Location
Figure 2: Site Layout and Soil and Groundwater Sampling Locations

APPENDICES

Appendix A: Example Maine DEP Non-Hazardous Waste Transporter Manifest

1. INTRODUCTION

Woodard & Curran has prepared this Environmental Media Management Plan (EMMP) for the Initiative for Digital Engineering and Life Sciences (IDEALS) to facilitate proper soil management and disposal procedures during redevelopment activities at the Roux Institute property located at 1 Bean Pot Circle in Portland, Maine (the "Site"; see **Figure 1**). The Site currently consists of the former Burnham & Morrill (B&M) factory, which operated from 1913 through 2021.

1.1 Purpose

This EMMP has been prepared for the Roux Institute at Northeastern University's Learning Research & Collaboration Building, parking garage, childcare facility, and Bean Building.

This plan has been prepared for use during activities that have the potential to disturb soil such as utility and subsurface structure installation/relocation work, foundation installation, grading, paving, and landscaping. Soil management procedures include site controls and measures to reduce exposure to soil during these activities, as well as to facilitate the proper handling, storage, characterization, transport, and offsite reuse or disposal of excess soil that may be generated during construction. This EMMP also addresses groundwater that may incidentally be encountered and/or require management or disposal during construction.

1.2 Site History

The Site consists of two contiguous parcels totaling 23.5 acres situated on the shoreline of Casco Bay in Portland, Cumberland County, Maine. Of the 23.5 acres, 13 acres are situated above the high tide line and the remainder is intertidal land of Casco Bay. The elevation of the Site is approximately 20 feet above sea level, and topography slopes downward from the north to the south, toward Casco Bay.

The Site is identified by the City of Portland Assessor's Online Database as Parcel IDs 447-A-001 and 447-A-002 (see **Figure 1**) and is currently owned IDEALS. In general, Parcel ID 447-A-001 consists of the land above the high tide line and Parcel ID 447-A-002 consists of intertidal land. **Figure 2** details the area of the Site above the high tide line.

Based on historical Sanborn Fire Insurance Maps and previous environmental reports, the Site was occupied by residences prior to 1913. In 1913, B&M moved to the Site from its original location on Franklin Street in Portland, and the four-story B&M Cannery Building was constructed on the Site, as well as the Codfish Building located on the pier at the southern end of the facility. Additional buildings were constructed within the next several years. In the 1920s, B&M began experimenting with brick-oven baked beans to offset declines in other product lines (e.g., canned fish, meat, and vegetables), and in the 1920s and 1930s, began selling brick-oven baked beans in cans. B&M continued to bake its beans in the traditional manner, in open pots inside brick ovens, through 2021.

Beginning in March 2023, redevelopment enabling work was completed at the Site. This included building material abatement work, removal of waste materials, discontinuation of select utilities, and the demolition of all buildings except the Cannery Building and the Codfish Building. This enabling work was completed in August 2023.

1.3 Previous Subsurface Investigations and Remedial Activities

A summary of previous subsurface investigations and remedial activities conducted at the Site is presented below.

1.3.1 UST Removal Site Assessment – 1995

On November 27, 1995, a 1,000-gallon gasoline underground storage tank (UST) was discovered during excavation for a new electrical service to the facility (see **Figure 2**). The UST had not been registered with the Maine Department of Environmental Protection (DEP). The age of the tank was unknown; however, it appeared that the UST had been abandoned and out of service for over 20 years before being discovered. Upon discovery, numerous holes ranging in size from pin-hole size to 0.25 inches in diameter were observed in the north end and bottom of the UST. The tank and piping were noted to be in poor condition. Low permeability silt and clay was observed at the base of the UST excavation which resulted in water collection in the disturbed areas. Groundwater was not initially encountered in the excavation; however, groundwater had equilibrated to between four and five feet below ground surface (bgs) within four to eight hours of the open excavation.

Soil samples were collected and analyzed for volatile organic compounds (VOCs) using a photoionization detector (PID). Although the concentrations of VOCs at the Site were below the cleanup goals set by the Maine DEP and therefore did not require further investigation or remedial action, the facility owner chose to pursue limited corrective action based on the presence of elevated concentrations of VOCs in the former UST excavation. The final excavation was 12 feet by 14 feet in area and approximately 8.5 feet bgs, and approximately 50 tons of oil-impacted soil were removed from the former UST excavation and taken to Commercial Recycling in Scarborough, Maine for asphalt batching. Confirmation soil samples were collected from the north and south ends of the final excavation and were analyzed for total gasoline-range organic (GRO) compounds. Laboratory results did not identify GRO compounds above method detection limits (1 part per million [ppm]). Consultant Dames & Moore recommended no further action associated with the removed UST (Dames & Moore, 1996).

1.3.2 Subsurface Site Investigation – 2021

In 2021, Woodard & Curran conducted a subsurface investigation at the Site on behalf of IDEALS to evaluate the current condition of environmental media at the Site. The investigation included soil and groundwater sampling, and sample locations are shown on **Figure 2**. As summarized below, no evidence of a significant point source release of oil and/or hazardous materials was identified in soil or groundwater samples collected from the Site.

Soil

Soil results were compared to the current (November 15, 2023) Maine DEP residential, commercial worker, park user, and construction worker risk-based Remedial Action Guidelines (RAGs) to evaluate whether soil conditions at the Site had been significantly impacted and to evaluate potential direct contact human health risk that could be experienced during or after redevelopment. In addition, results were reviewed relative to example receiving facility acceptance requirements to assist with potential redevelopment planning.

VOCs, semivolatile organic compounds (SVOCs), and extractable petroleum hydrocarbons (EPH) were detected in several soil samples; however, concentrations were well below the current RAGs. Several metals

were also detected below the applicable RAGs with the exception of arsenic. For arsenic, the residential RAG of 9.3 milligrams per kilogram (mg/kg) was exceeded in soil samples B-21-07 (0-5') and B-21-09 (0-5') with concentrations of 9.73 mg/kg and 10.1 mg/kg, respectively. Sample B-21-09 (0-5') was analyzed for Toxicity Characteristic Leaching Procedure (TCLP) lead because the total lead concentration was over 100 mg/kg, and leachable lead was not detected above the laboratory reporting limit of 0.5 mg/L. Based on the soil results, no evidence of a significant point source release of oil and/or hazardous materials to soil was identified at the Site.

In addition to the analyses listed above (VOCs, SVOCs, EPH, and metals), three soil samples were also analyzed for typical acceptance criteria of nearby soil receiving facilities, including polychlorinated biphenyls (PCBs), pesticides, herbicides, corrosivity (pH), reactive cyanide, reactive sulfide, and ignitability, to provide an initial assessment of potential disposal or reuse options. PCBs, pesticides, and herbicides were not detected in these samples.

Groundwater

Groundwater results were compared to the current Maine DEP risk-based RAGs to evaluate whether groundwater conditions at the Site have been significantly impacted and to evaluate the potential for risk that may be associated with contact with potentially contaminated groundwater during future redevelopment activities.

As shown in **Table 1**, dissolved arsenic and dissolved barium were the only detected analytes in groundwater; VOCs, SVOCs, EPH, and the remaining metals were not detected above laboratory reporting limits. Detected concentrations of arsenic and barium were well below the applicable construction worker RAGs. Based on these groundwater results, no evidence of a significant point source release of oil and/or hazardous materials to groundwater was identified at the Site and significant health risk to construction workers that may be experienced during potential future redevelopment activities was not anticipated.

Table 1: Detected Groundwater Analytical Results

Compound	MW-03	MW-06	MW-08	MW-09	MW-10	MW-16	Construction Worker RAG[1]
Dissolved Metals (µg/L)							
Arsenic	< 0.5	**24.16**	**0.68**	< 5	**35.76**	**1.81**	5,800
Barium	**20**	**26**	**53**	**56**	**39**	**27**	100,000

[1] RAG: Maine Remedial Action Guidelines for Sites Contaminated with Hazardous Substances, Maine DEP, Bureau of Remediation and Waste Management (revised November 15, 2023).
Bold = analyte was detected in the given sample.
Shading = detected concentration exceeds Commercial Worker RAG. No concentrations exceeded the respective RAGs.
< = not detected at indicated reporting limit.

1.3.3 Subsurface Site Investigation – 2022

In June 2022, Woodard & Curran conducted a soil subsurface investigation at the Site on behalf of IDEALS in conjunction with a geotechnical investigation conducted by S.W. Cole Engineering, Inc. The purpose of this activity was to gather additional information from the area of planned future building construction and characterize excess soil that may be generated during future construction activities. Sample locations are

shown on **Figure 2**. As summarized below, no evidence of a significant point source release of oil and/or hazardous materials was identified in soil samples collected from this area of investigation at the Site.

Soil results were compared to the current Maine DEP residential, commercial worker, park user, and construction worker risk-based RAGs to evaluate whether soil conditions at the Site had been significantly impacted and to evaluate potential direct contact human health risk that could be experienced during or after redevelopment. In addition, results were reviewed relative to example receiving facility acceptance requirements to assist with potential redevelopment planning.

VOCs, SVOCs, EPH, volatile petroleum hydrocarbons (VPH), pesticides, and PCBs were detected in soil samples; however, concentrations were well below the current RAGs. Several metals were also detected below the applicable RAGs with the exception of arsenic and lead. For arsenic, the residential RAG of 9.3 mg/kg was exceeded in soil samples B-22-5 (0.5-2'), B-22-6 (0-6'), and B-22-16 (3-9') with concentrations of 12.1, 13.2, and 21.2 mg/kg, respectively. For lead, the residential RAG (200 mg/kg), park user RAG (420 mg/kg), construction worker RAG (460 mg/kg), and commercial worker RAG (440 mg/kg) were exceeded in soil sample B-22-10 (22-25') with a concentration of 577 mg/kg. This sample was analyzed for TCLP lead, and leachable lead was not detected above the laboratory reporting limit of 0.5 mg/L.

Though lead concentrations were higher at depth in sample location B-22-10, information gathered during Woodard & Curran's February 22, 2022, Phase I Environmental Site Assessment (Woodard & Curran, 2022) indicated that this area consists of filled land and it is likely the lead results from this sample are related to the fill materials and not a release of oil and/or hazardous materials.

In addition, overall Site conditions related to lead are not expected to pose a risk to Site construction workers, as average concentrations across the Site for lead are below the applicable construction worker RAG. However, recommended approaches for risk management during excavation activities are conservatively included in this EMMP.

In addition to the detected analytes listed above (VOCs, SVOCs, EPH, VPH, pesticides, PCBs, and metals), soil samples were also analyzed for typical acceptance criteria of nearby soil receiving facilities, including herbicides, hexavalent chromium, corrosivity (pH), reactive cyanide, reactive sulfide, and ignitability, to provide an additional assessment of potential disposal or reuse options. Herbicides were not detected in these samples and the remaining waste characterization results were within a range that is typically acceptable to Maine-based commercial soil receiving facilities (e.g., Waste Management's Crossroads Landfill).

1.3.4 Limited Soil Sampling During Demolition – 2023

In June of 2023, an area of dark, presumably stained soil was observed below a former building (the Maintenance Barn) during demolition (see **Figure 2**). Two samples were collected from this material on June 28, 2023, and analyzed for total RCRA 8 metals and EPH. Though concentrations of metals and EPH were identified, all detected concentrations were below the most stringent RAGs. Therefore, no additional requirements were identified relative to the management of this soil.

1.3.5 Subsurface Site Investigation – 2024

In February 2024, Woodard & Curran conducted a soil subsurface investigation at the Site on behalf of IDEALS to characterize soil in areas expected to generate excess material during construction, as well as to

increase the spatial distribution of soil data throughout the Site. Sample locations are shown on **Figure 2**. A total of ten soil samples, consisting of eight fill and two native samples, were analyzed for typical soil receiving facility acceptance criteria. As summarized below, no evidence of a significant point source release of oil and/or hazardous materials was identified in soil samples collected from this area of investigation at the Site.

Soil results were compared to the current Maine DEP residential, commercial worker, park user, and construction worker risk-based RAGs to evaluate whether soil conditions at the Site had been significantly impacted and to evaluate potential direct contact human health risk that could be experienced during or after redevelopment. In addition, results were reviewed relative to example receiving facility acceptance requirements to assist with potential redevelopment planning.

SVOCs, EPH, VPH, pesticides, and PCBs were detected in soil samples; however, concentrations were well below the current RAGs. Several metals were also detected below the applicable RAGs with the exception of arsenic. For arsenic, the residential RAG of 9.3 mg/kg was exceeded in all samples (with the exception of B-24-06 (0-2')), with concentrations ranging from 10.3 to 28.9 mg/kg.

In addition to the detected analytes listed above (SVOCs, EPH, VPH, pesticides, PCBs, and metals), soil samples were also analyzed for typical acceptance criteria of Maine-based soil receiving facilities, including VOCs, herbicides, corrosivity (pH), reactive cyanide, reactive sulfide, and ignitability, to provide an additional assessment of potential disposal or reuse options. Herbicides were not detected in these samples and the remaining waste characterization results were within a range that is typically acceptable to Maine-based licensed soil receiving facilities.

1.4 Summary of Expected Site Conditions

Consistent with the findings of the sampling and analyses conducted by Woodard & Curran, conditions that may be reasonably anticipated during redevelopment are as follows:

- The Site and surrounding area are connected to public water supply and sewer services.
- Subsurface conditions at the Site generally consist of fill material composed of varying amounts of sand, silt, clay, and gravel with occasional concrete, brick, shells, and plastic. Native material consisting of glaciomarine clay was observed below the fill.
- As shown in **Table 2**, which presents the maximum and average detected analyte concentrations in at the Site, soil that may be encountered during redevelopment may contain low-level VOCs, SVOCs, EPH, VPH, pesticides, PCBs, and metals. All detected constituent concentrations are below the available risk-based human health standards except for arsenic and lead, which exceeded the Maine DEP residential RAGs at certain locations. However, average concentrations for these analytes across the investigated area at the Site are below the most conservative Maine DEP residential RAGs.
- **Table 2** also presents a comparison of Site soil data to Maine DEP's screening levels for beneficial use of soil as documented in Maine Solid Waste Rules Chapter 418. Based on this comparison, it is likely that certain soil that may be generated as excess during construction at the Site may meet the requirements for beneficial use in other offsite construction projects following applicable permitting. Alternatively, following necessary characterization, profiling, and approval, excess soil

that may be generated during redevelopment at the Site may be acceptable for disposal at a Maine DEP licensed receiving facility, such as a commercial landfill.

- No petroleum saturated soil was observed during the investigations and no evidence of a significant point source release of oil and/or hazardous materials was identified in soil or groundwater samples collected from the Site. A lens of suspected petroleum product was observed during the installation of one soil boring completed in 2022 (B-22-14); however, subsequent analysis of soil represented by this sample indicated that concentrations of petroleum did not exceed the Maine DEP construction worker or residential RAGs. In addition, an area of dark, presumably stained soil was observed below a former building (the Maintenance Barn) during demolition. Two samples were collected from this material and analyzed for total RCRA 8 metals and EPH. Though concentrations of metals and EPH were identified, the detected concentrations were below the most stringent RAGs. Therefore, no additional requirements were identified relative to the management of this soil.
- No soil classified as hazardous waste is known to be present at the Site.
- Depth to groundwater ranged from 4.9 feet bgs to 20.5 feet bgs; however, groundwater levels may be tidally influenced and fluctuate in response to nearby tidal water levels.
- Historical records reviewed during a previous environmental assessment (Woodard & Curran, 2022) indicated the locations of former USTs on the Site. No active USTs are known at the Site and the location of any closed or abandoned USTs that may potentially exist at the Site are unknown. The locations of documented former USTs are shown on **Figure 2**; however, the historical records may not be comprehensive and additional USTs may have been used at the Site and may be found during redevelopment.

2. RESPONSIBILITIES

The Owner of the Site is responsible for adopting and implementing this EMMP and ensuring that the EMMP is adhered to during construction. This responsibility may be contractually transferred to the Construction Manager or other designated responsible party as appropriate for the project. The Owner or designated responsible party is responsible for notifying the Environmental Professional at the start of work and in the event of unanticipated conditions, as described in Section 4.4.

Specific requirements to be fulfilled by the Owner or designated responsible party include the following:

1. Maintain recordkeeping of the soil excavation, monitoring, onsite management, onsite reuse, and offsite reuse and disposal activities performed during any soil disturbing activity.
2. Document environmental investigations conducted in conjunction with the work, including sampling results, and make this information available to designated employees and applicable contractors that will be conducting work in the area where the EMMP will be implemented.
3. Ensure that work conducted for the Site that has the potential to disturb existing soil and/or generate excess soil is monitored and conducted in accordance with this EMMP.
4. Assist the earthwork contractor with the recommended soil management activities (described herein); and
5. Provide training and risk communication to workers as needed, as described in Sections 3.2 and 3.3.

The following contact information is provided for use during the implementation of this EMMP:

Owner

Sam Reiche
IDEALS
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Portland, ME 04101
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sam.reiche@ideals.org

Construction Manager

Consigli Construction Company
Project Manager To be determined

Environmental Professional

Jedd S. Steinglass
Project Manager
Woodard & Curran
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207.756.2319 (c)
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Earthwork Contractor

To be determined

3. GENERAL HEALTH & SAFETY RECOMMENDATIONS

This section has been prepared to provide general health and safety information and recommend the minimum health and safety related procedures for construction at the Site. This information is focused to assist persons not otherwise required to prepare their own health and safety plan (e.g., visitors) while engaged in activities at the Site.

Please note that the information presented in this section is not appropriate for use by any personnel that are required to prepare a Health and Safety Plan (HASP) to comply with any applicable Federal, State, local, or other health and/or safety requirements and safe construction practices.

3.1 Personal Protective Equipment

Modified Level D personal protective equipment (PPE), as described below in **Table 3**, is suggested for initial entry onto the Site and for general construction and site work activities. Work gloves are recommended when directly handling Site soil (e.g., during foundation and utility installation work) and additional PPE is recommended when handing grossly contaminated[1] media as described in **Table 3**.

Table 3: Recommended PPE Summary

Activity	Recommended PPE
General construction and site work	Modified Level D: Long-sleeved shirts and long pants Composite or steel toed boots with socks Hard hats Safety glasses Reflective safety/traffic vest
Tasks where personnel will be directly handling soil (e.g., foundation and utility installation work)	Modified Level D as described above with the addition of: Work Gloves
Handling of grossly contaminated soil, water, and other media[1]	Modified Level D as described above with the addition of (one or more as applicable for the specific work task): Disposable nitrile or chemical resistant gloves Tyvek® or equivalent coveralls Disposable rubber boot covers Rubber waders or boots

No Level C work activities are anticipated; however, conditions should be continuously monitored by appropriately trained personnel to ensure that conditions requiring Level C or higher protection are not present.

[1] Indicators of gross contamination may include the presence of free petroleum product and/or persistent odors associated with petroleum, chlorinated solvents, or unknown materials within the work zone. These conditions are not anticipated but may nevertheless be found during redevelopment.

3.2 Training Requirements

Based on known concentrations of contaminants as determined through the previously described environmental investigations conducted at the Site, a comparison of average analytical results to Maine DEP RAGs, and the activities and personnel that are anticipated to be onsite during construction and redevelopment (i.e., construction personnel and brief visits by non-construction personnel), no specialized training or certification is required. However, as a conservative measure, basic project-specific hazard training and/or risk communication is recommended for Site workers who may contact soil (e.g., earthwork contractors, underground utility installers, landscapers). Recommended practices are summarized below in Section 3.3. In addition, qualified personnel should continuously monitor Site conditions to identify potential unanticipated conditions that may warrant specialized training.

3.3 Hazard Communication

Injury and/or illness may result when personnel come in direct contact with hazardous materials, or breathe hazardous dusts, fumes, mists, vapors, or gases. It is recommended that workers abide by their own written Hazard Communication Program requirements.

Example hazards and mitigation techniques that are considered best practices and may be applicable are summarized below:

- Inhalation of soil containing contaminants is possible if excessive dust is not controlled during work activities. Dust control measures detailed in Section 4.3.1 should be followed throughout the work activities.
- Ingestion of contaminant-containing soil may result if good personal hygiene practices are not followed. Personnel should wash hands thoroughly after completion of work, before breaks, and before eating or drinking. Smoking and chewing gum or tobacco should be discouraged or prohibited due to the potential for hand-to-mouth transfer of soil. Additionally, as described in Section 3.1, personnel should wear work gloves when directly handling soil.
- The tracking of contaminant-containing soil originating at the Site to offsite locations should be avoided. For example, work boots and clothing should be changed out for street clothes prior to leaving the Site and/or before coming into contact with non-construction personnel.
- Eye exposure to contaminant-containing particles or dusts may occur when a worker does not wear safety glasses and/or when unwashed hands contact the eyes. Safety glasses and/or handwashing as noted above is recommended to reduce this potential hazard.

4. ENVIRONMENTAL MEDIA MANAGEMENT PLAN

4.1 Overview

All soil at the Site that is disturbed during work activities (e.g., general site construction, work in the public way, utility and other subsurface structure maintenance/repair/installation/relocation work, grading, paving, landscaping, and foundation installation) must be properly managed.

Provisions for the management and onsite reuse of soil that may generally be encountered or disturbed during work activities are provided within this EMMP. In addition, though environmental conditions at the Site do not warrant the performance of active soil remediation, this EMMP may be used to guide the management of excavated soil that may need to be transported offsite for permitted reuse, or disposal based on the design and/or volumetric constraints of the work. Finally, if dewatering is necessary to facilitate the work, recommended practices to complete these activities are also described in this EMMP.

Please note that though no specific investigation was completed outside the limits of the Site during Woodard & Curran's investigations, the procedures outlined in this document are sufficiently conservative such that work in the public way, if applicable, may also be managed in accordance with this EMMP. Alternatively, material originating from the public way may be transferred to the City of Portland, following their approval, for proper management and disposal.

The general soil and groundwater management process for the project is as follows:

1. **Initiation of Work Activities**: Includes pre-construction considerations in Section 4.2.
2. **Construction Soil Management Controls**: Construction practices that limit migration and transport of site soil are described in Section 4.3 and include dust control measures, track-out controls, stockpile management, and erosion control.
3. **Soil Excavation Monitoring**: Environmental conditions have been evaluated based on existing data. However, olfactory and visual observations are necessary throughout the project to identify potential unanticipated conditions as described in Section 4.4.
4. **Waste Characterization**: Excavated soil designated for offsite disposal or reuse shall be adequately characterized by laboratory analyses prior to offsite transport as described in Section 4.5.2.
5. **Onsite Soil Reuse**: Based on existing data, soil that originated at the Site may be reused onsite, provided that it is managed in accordance with Section 4.6.1.
6. **Offsite Reuse or Disposal**: Results of the waste characterization will be used to determine how excess soil may be reused or disposed offsite and to obtain permits and/or receiving facility acceptance approval. Potential reuse and disposal options are described in Sections 4.6.2 through 4.6.4.
7. **Dewatering/Groundwater Management**: If groundwater is encountered during excavation activities and dewatering is necessary, groundwater shall be managed in accordance with Section 4.7.

4.2 Initiation of Work Activities

4.2.1 Potential Permits Required for Soil Excavation

Prior to conducting subsurface activities, DIG SAFE must be notified and a DIG SAFE permit number acquired. In addition, the Owner and/or its representative(s) will be responsible for obtaining all permits (e.g., building, sewer connection, water, gas) and approvals from the appropriate Federal, State, or local regulatory authorities needed for activities associated with the project.

4.2.2 Site Access Control

Access to the Site shall be adequately restricted to prevent non-construction personnel from contacting existing soil during the performance of construction and redevelopment work. These controls may include temporary or permanent perimeter fencing, signage, or a combination of similar measures.

4.2.3 Temporary Facilities/Utilities

Water supply for dust suppression and decontamination will be provided by the contractor in coordination with the Portland Water District, as needed. Possible water supply options include connecting to existing distributed service, a temporary water service connection to the water main, or to a fire hydrant located near the Site.

4.3 Construction Soil Management Controls

4.3.1 Dust Control

Any area of soil at the Site that is disturbed or otherwise affected during construction and redevelopment work shall be consistently maintained to minimize the creation and dispersion of dust. These areas may include but are not necessarily limited to active excavation areas, foundation voids, haul roads, active soil stockpiles and loading areas, entrances and exits to the Site, and adjacent public roadways. Dust shall be controlled from activities including but not limited to excavation, soil loading, and vehicle traffic.

Dust suppression shall be conducted through regular sweeping and sprinkling of water, as necessary, and/or with an appropriate commercial grade dust suppressant. Several applications of water and/or other dust suppressants may be required each day to effectively manage dust. Any excess water generated during dust control activities shall be managed in accordance with Section 4.7.

4.3.2 Track-out Controls

To prevent the tracking of soil from the Site into the public roadways, a stabilized construction entrance, tire wash area, and/or similar provisions must be established and the tires of vehicles exiting the Site shall be free of soil and dust that could be tracked into the street or otherwise mobilized. All truck tires and equipment will be inspected and cleaned as necessary prior to leaving the Site. In addition, regular street sweeping shall be conducted to clean the roadways adjacent to the Site where fugitive soil or dust may become located.

4.3.3 Stockpile Management

Stockpiles of non-native materials (e.g., fill) shall be handled in a manner that minimizes human contact and prevents the uncontrolled migration of soil away from the Site for the duration of the project. To meet these performance objectives, the following controls shall be used:

1. Stockpiled soil shall be segregated based on the methods selected for reuse or disposal (see Section 4.6) and surrounded by a physical barrier or a combination of barriers, such as temporary or permanent perimeter fencing and/or signage, to prohibit access by unauthorized persons. The barriers shall be maintained so that they effectively prohibit such access for the duration of the work. Perimeter fencing that surrounds the entire area of work at the Site is acceptable as long as the remaining stockpile management procedures are fulfilled;
2. Dust suppression measures shall be employed to prevent the wind-borne entrainment and migration of soil particles from stockpiled soil during the active working or loading of this material. These measures may include periodic sprinkling of water, application of an appropriate commercial grade dust suppressant, or covering with impervious tarps, geotextile fabric, or similar materials; and
3. Erosion control measures shall be employed to prevent the offsite runoff of stockpiled soil. Erosion control measures may include straw roll/wattle, silt fence, plastic membrane, the covering of storm drain catch basins, or other suitable means, provided that offsite soil runoff is effectively prevented for the duration of time that the stockpile is present.

The measures described above shall be used to manage stockpiled Site soil during the performance of construction work. However, any generated stockpile of Site soil that is not being actively worked for a period of 14 days or more shall be completely covered with impervious tarps or similar polyethylene sheeting that is properly secured and designed for such a purpose. Covers shall be maintained throughout the period of onsite storage. Alternatively, stockpiled soil may be loaded into covered DOT-approved shipping containers.

The stockpile management requirements of this section do not apply to imported materials that are to be used at the Site during construction, or stockpiles of native material. However, general construction best management practices and applicable site development permit requirements shall still apply to these materials.

4.3.4 Erosion Control

Erosion control measures shall be employed, as needed, to prevent the offsite runoff of soil from the Site and stockpiles. Standard construction erosion control measures shall be consistent with site development conditions of approval as presented by the City of Portland and may include staked hay bales, plastic membrane, the covering of storm drain catch basins, or other suitable means, provided that offsite soil runoff is effectively prevented.

4.4 Soil Excavation Monitoring

During excavation activities for the Site, the Owner, Construction Manager, Environmental Professional, or an assigned qualified party shall be present to monitor subsurface soil conditions and brief construction

crews on soil handling and safety issues. The Environmental Professional shall be called in to assist in soil classifications and handling decisions if soils are encountered that differ from the anticipated conditions.

Site personnel shall examine excavated materials continuously for visual and/or olfactory evidence of petroleum or other impacts. Such evidence may include, but is not limited to, the following:

- observation of discoloration or staining;
- distinct solid waste layers (i.e., evidence of landfilling);
- presence of free petroleum product; and/or
- olfactory evidence including, but not limited to, odors associated with petroleum, chlorinated solvents, or unknown materials.

An interpretation of analytical results generated during Woodard & Curran's subsurface investigation relative to the Maine DEP RAGs indicates that soil disturbed during construction can be managed during redevelopment and reused onsite as described in Section 4.6.1, following health and safety recommendations described in Section 3. **However**, **if conditions different than those anticipated at the initiation of construction activities are encountered during excavation (e.g., significant staining, odor, solid waste, or free petroleum product) work shall stop. Site personnel shall then notify the Environmental Professional to assist in planning further excavation, monitoring, and documentation as required.**

Relevant contact information for the Environmental Professional is presented in Section 2.

4.5 Soil Characterization

Site conditions that may be anticipated during construction are summarized in Sections 1.3 and 1.4. However, this information shall be supplemented by olfactory and visual observations documented throughout the project to identify potential unanticipated conditions. Petroleum residues can also be identified through field screening in accordance with the Maine DEP Standard Operating Procedure (SOP) TS004, which incorporates the use of a field PID, oleophilic dye test, and/or water shake test for free product as appropriate. Field screening will be completed by the Environmental Professional if conditions different than those anticipated at the initiation of construction activities are encountered during excavation (e.g., significant staining, odor, waste, or free petroleum product).

Soil categories are described in Section 4.5.1. Waste characterization procedures are described in Section 4.5.2 for soil that will be transported for offsite reuse or disposal.

4.5.1 Soil Categories

Based on results of the previous environmental investigations, the following soil groups are applicable for all construction work at the Site:

Group 1 Soils. Group 1 soils are clean, naturally deposited, uncontaminated soils as demonstrated by analytical testing results (i.e., contaminants of concern not detected above laboratory reporting limits and metals below background concentrations). Group 1 soils shall also have no visible or olfactory evidence of contamination (e.g., coal, ash, cinders, debris, and/or dark brown or black color). If field screening occurs, Group 1 soils shall exhibit no field PID results of greater than background or the presence of petroleum by other field applicable screening methods as described

in Maine DEP SOP TS004. Based on the findings of investigations completed at the Site, naturally deposited marine clay that may be encountered during construction is considered to meet the definition of Group 1. Additional characterization sampling (see Section 4.5.2) is required to delineate additional native material that is proposed for management as Group 1 soil at the Site if other types of native material is to be transported offsite for reuse or disposal.

Group 2 Soils. Group 2 soils have detectable concentrations of contaminants of concern and/or metal concentrations above background; exhibit visible and/or olfactory evidence of contamination; and/or field screening readings of background or greater on a PID or detected petroleum based on other field screening methods as described in Maine DEP SOP TS004. Visual evidence of contamination may include coal, ash, cinders, debris, and/or dark brown or black color. Group 2 soils may have a petroleum or tar odor. Based on the results of the previous investigations, fill material throughout the Site has been characterized as Group 2.

Group 2 soils may be reused at the Site in accordance with the requirements of Section 4.6.1. Group 2 soils that cannot be reused at the Site may be reused offsite in accordance with Section 4.6.2 or properly disposed of in accordance with Section 4.6.3.

Group 3 Soils. If soils from the Site are found to fall into the category of a Hazardous Waste on the basis of toxicity characteristic leaching procedure (TCLP) or other laboratory testing, those soils are characterized as Group 3 soils. Group 3 soils are typically not reused onsite except in certain circumstances to be determined by the Environmental Professional. For offsite disposal, unless Group 3 soil is properly treated in accordance with all state and federal requirements to eliminate the hazardous characteristic, it must be properly disposed of as hazardous waste (Section 4.6.4). Based on the results of the previous investigations, Group 3 soils are not anticipated at the Site.

Construction debris (unpainted concrete, fully cured asphalt, brick, and other inert materials that are free of soil and visible contamination) are not subject to the requirements of this EMMP and may be disposed or recycled in accordance with Maine DEP Chapter 400.

4.5.2 Waste Characterization

4.5.2.1 Previously Completed Waste Characterization

Three waste characterization soil samples of fill materials were collected by Woodard & Curran during the 2021 subsurface investigation, 17 were collected in 2022, and 8 were collected in 2024. Analytical results are available upon request from the Environmental Professional.

This data may be suitable to receive approval from a properly permitted receiving facility to dispose of up to 14,000 tons[1] of soil from the Site. Facility acceptance and approval coordination for this soil will be conducted by the Owner or Construction Manager or designated representative, with assistance from the Environmental Professional. **Documentation of facility acceptance must be provided for review and approval by the Environmental Professional prior to any offsite transport of soil.**

[1] Amount based on disposal facility sample frequency requirement of 1 sample per 500 tons for projects generating greater than 2,000 tons of soil.

4.5.2.2 Supplemental Waste Characterization

If the selected disposal facility requires further sampling and laboratory analysis prior to the removal of soil from the Site, if more than 14,000 tons of non-hazardous soil must be moved offsite, and/or if conditions that are inconsistent with those documented during the previous investigations are observed[1], supplemental waste characterization sampling shall be completed and/or documented by the Environmental Professional. Associated activities will include soil sampling, laboratory analysis, data review, and facility acceptance and approval coordination. Waste characterization samples may be obtained in situ through test pitting or may be collected from existing stockpiles or containers so long as the samples provide an accurate and unbiased representation of the soil waste stream.

Supplemental waste characterization analytical requirements and sampling frequency will be specified by the selected offsite disposal or reuse facility. Typical waste characterization analytical sampling parameters consist of EPH, VPH, VOCs, PCBs, RCRA 8 metals, hexavalent chromium, pesticides, herbicides, ignitability, and reactive cyanide and sulfide. However, this list must be verified by the selected disposal facility prior to analysis to ensure that it meets specific disposal facility acceptance criteria.

4.6 Soil Reuse and Disposal

In general, and as previously described, it is anticipated that existing soil located throughout the Site will be disturbed during construction and redevelopment activities. At a minimum, all Site soil that is disturbed during the performance of construction or redevelopment work shall be handled and stored in a manner that minimizes human contact and prevents the uncontrolled migration of soil away from the Site for the duration of the project.

4.6.1 Onsite Reuse

Consistent with known conditions (i.e., detectable concentrations of contaminants of concern below the applicable construction worker and commercial worker RAGs) and the intended use of the Site as a non-residential education institution and parking garage, it is anticipated that any existing Site soil that is disturbed or otherwise affected during construction and redevelopment work may be reused at the Site in accordance with earthwork specifications.

In the area of the proposed Childcare Play Area (see Figure 2) one of the following measures should be implemented to minimize direct contract with reused and existing Site soil:

- A high visibility demarcation layer (e.g., orange snow fencing, orange TenCate Mirafi® 140NLO) overlain by 6 inches or greater of clean soil then at least 6 inches of loam or topsoil and landscaping; or
- 24 inches or greater of clean soil stabilized through landscaping (no underlaying demarcation layer required if 24 inches of clean materials are used); or
- Hardscaping such as asphalt or concrete pavement or pavers, which may or may not be overlain by artificial turf or similar surfaces. If hardscaping is used, no clean soil cover is necessary

[1] e.g., significant staining, odor, solid waste, or free petroleum product

between the reused or existing Site soil and the base of the hardscaping, unless otherwise required by the landscape design.

Imported materials from appropriate sources (e.g., loam and topsoil from landscaping companies or virgin sources) do not require characterization or approval prior to use below landscaping.

Example soil reuse applications include backfill and grading materials. However, the soil excavation monitoring procedures described in Section 4.4 must be completed throughout the performance of construction and redevelopment activities to verify that onsite soil reuse is appropriate.

If conditions different than those anticipated are encountered (e.g., significant staining, odor, solid waste, or free petroleum product) work shall stop. Site personnel shall then notify the Environmental Professional to assist in planning further excavation, monitoring, and documentation as required.

4.6.2 Offsite Reuse

Group 1 soil may be reused off site as fill in non-residential construction projects without the need for additional Maine DEP permitting. Documentation of proposed non-residential use application shall be provided to the Environmental Professional prior to offsite shipment.

Group 2 soil that has been properly characterized may be beneficially reused at a facility that maintains an appropriate permit issued in accordance with Maine DEP Chapter 418. Proof of facility acceptance and approval, as well as the proposed shipment documentation, shall be retained for project documentation by the Owner and provided to the Environmental Professional for approval prior to any offsite transport of soil.

Group 3 soil categorized as Hazardous Waste cannot be reused offsite and, unless properly treated in accordance with all state and federal requirements to eliminate the hazardous characteristic, must be disposed offsite as hazardous waste (see Section 4.6.4).

The acceptability of each proposed offsite reuse application for Group 2 soil must be in accordance with the license and allowable criteria of the selected facility as verified and approved by the Environmental Professional prior to the removal of any soil from the Site.

4.6.3 Offsite Disposal

Group 1 and/or Group 2 soil from the Site that is designated for offsite disposal at a Maine DEP-permitted receiving facility must be profiled and accepted at the selected facility prior to shipment. Proof of facility acceptance and approval, as well as the proposed shipment documentation, shall be retained for project documentation by the Construction Manager and provided to the Environmental Professional for approval prior to any offsite transport of soil.

Subject to current appropriate permitting, potential offsite disposal facilities for Group 1 and Group 2 soil include, but are not necessarily limited to:

- Waste Management Crossroads Landfill, Norridgewock, ME
- Waste Management Turnkey Landfill, Rochester, NH

- Casella Juniper Ridge Landfill, Old Town, ME

4.6.4 Offsite Disposal of Hazardous Waste

Soil that meets any of the criteria for a characteristic hazardous waste as defined in 40 CFR 261 (i.e., Group 3) is not anticipated at the Site. However, if hazardous waste is identified, notice shall be provided immediately to the Environmental Professional. Group 3 soils are typically not reused onsite except in certain circumstances to be determined by the Environmental Professional. If properly treated in accordance with all state and federal requirements to eliminate the hazardous characteristic, it is possible that Group 3 soil may be disposed at a properly permitted non-hazardous receiving facility. Otherwise, this material must be transported offsite by a licensed hazardous waste transporter, shipped under a uniform hazardous waste manifest, and disposed of as a hazardous waste. Appropriate receiving facility profiling, acceptance, and approval by the Environmental Professional in consultation with the Maine DEP is required prior to the removal of any hazardous waste from the Site.

4.6.5 Offsite Soil Transport and Documentation

All Group 2 soil that is transported offsite must be shipped by a Maine DEP licensed Non-Hazardous Waste Transporter. A Maine DEP licensed Non-Hazardous Waste Transporter is not required for the offsite transport of Group 1 soil; however, all soil removed from the Site whether for offsite reuse or disposal must be shipped under a Maine DEP Nonhazardous Waste Transporter Manifest or a similar shipping document that identifies the source location and description of the material, volume and/or weight, shipment date, and receiving location. Following offsite transportation, clear copies of delivery tickets, acceptance tickets, weight slips, Bill of Lading forms, and/or manifests shall be provided for project documentation. An example copy of a Maine DEP Non-Hazardous Waste Transporter Manifest is included for reference in **Appendix A**.

4.6.6 Verification / Confirmatory Soil Sampling

It is not anticipated that verification and/or confirmatory sampling will be required at this time. However, if conditions are different than those anticipated (e.g., levels of contamination observed during work activities or waste characterization sampling are greater than expected) additional sampling may be warranted. The decision to conduct verification/confirmatory sampling, and the rationale, methodology, and data quality objectives will be established by the Environmental Professional.

4.7 Dewatering / Groundwater Management

Groundwater may be encountered during construction activities. The condition of groundwater shall be monitored during dewatering activities. Impacted groundwater may be identified by a petroleum or solvent odor, presence of a petroleum sheen, or field screening of soil wetted by groundwater. If dewatering is necessary to facilitate construction, the water will be pumped from the excavation and either:

1. Discharged to the ground surface within the immediate work area, provided that appropriate best management practices are implemented (e.g., erosion and sedimentation controls, engineered infiltration basin) to prevent the offsite migration of the generated materials.
2. Reinjected into the ground by sumps excavated onsite with the location documented by the Environmental Professional.

3. Discharged to the municipal sewer system in accordance with all local, State, and Federal requirements. In this instance, the water may need to be containerized (e.g., fractionation tank), tested, and pretreated, if necessary, prior to disposal to meet the requirements of the Portland Water District. A Dewatering Plan and Application must be submitted and approved prior to discharging water from a construction site to City of Portland infrastructure. Typical analytical requirements are listed below:
    - pH and conductivity
    - total metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc)
    - total cyanide
    - EPH and VPH
4. Managed onsite in appropriate containers (e.g., fractionation tank) for subsequent waste characterization and offsite disposal. Waste characterization must be conducted in accordance with the selected disposal facility's acceptance requirements.

Water generated from dewatering of wet soil shall also be managed as described above. Groundwater that is encountered during construction activities but is not removed from the excavation either by pumping or excavation of wet soil does not need to be managed as part of this EMMP.

If the presence of petroleum or other unexpected conditions are encountered in association with groundwater, the dewatering activities shall stop. Site personnel shall then notify the Environmental Professional to assist in planning further dewatered groundwater management.

4.8 Decontamination Procedures

As a general practice, tools and equipment that contact Group 2 or Group 3 soil will be decontaminated prior to taking them offsite. This requirement will be applicable to all tools, heavy machinery, and excavating and hauling equipment used during Site construction activities and handling of Group 2 or Group 3 soil. Decontamination shall include removal of visible soil and dust with a dry broom/brush and subsequent inspection. If the dry brush technique is not sufficient to remove visible signs of soil and dust, wet decontamination consisting of washing down equipment with high-pressure water hoses, brushes, and/or steam must be performed. In addition, all tools and equipment that contact groundwater at the Site shall be decontaminated such that free liquids, dirt, and silt are removed prior to taking them offsite.

All water generated during decontamination activities shall be managed in accordance with Section 4.7.

4.9 Recordkeeping and Reporting

Records shall be kept of all soil excavation and handling activities. Recordkeeping requirements are ultimately the responsibility of the Owner, but in practice may be fulfilled by the Construction Manager and/or Earthwork Contractor. These records shall include but not be limited to the following:

1. A list of the contractors and any subcontractors conducting soil excavation, onsite management and reuse, and offsite transport and reuse/disposal work;
2. Copies of HASP(s) used;

3. Copies of shipping records for all soil that is transported offsite;
4. Copies of existing conditions and as-built site plans showing the general locations where Group 1, Group 2, and Group 3 soil have been reused (as applicable), and the location and extent of any pavement, concrete, landscaping, demarcation layers, and permanent building foundations;
5. Copies of analytical results for samples collected for waste characterization (Section 4.5.2), confirmation sampling (Section 4.6.5), and/or groundwater discharge (Section 4.7); and
6. Copies of plans showing locations where groundwater was reinjected into sumps, if used, after dewatering.

If additional or unexpected contamination is discovered, soil characterization and/or verification soil sampling records will be retained, and copies provided to the Environmental Professional.

5. REFERENCES

City of Portland, 2016. Public Work Department Rules and Regulations for the Use of the Sewer System. October 22, 2016.

Dames & Moore, 1996. Maine UST Removal Site Assessment Summary, Burnham & Morrill (B&M); January 25.

Woodard & Curran, 2022. Phase I Environmental Site Assessment, 1 Bean Pot Circle, Portland, Maine; February 22.

TABLES

Table 1: Detected Groundwater Analytical Results (embedded)

Table 2: Summary of Detected Soil Analytical Results

Table 3: Recommended PPE Summary (embedded)

Table 2: Summary of Detected Soil Analytical Results

	Number of Samples	No. of Non-Detects	Maximum Detected Concentration	Average Concentration[1]	Soil Remedial Action Guidelines (mg/kg)[2]				ME DEP Chapter 418 Appendix A[3]
					Residential RAGs	Commercial Worker RAGs	Park User RAGs	Construction Worker RAGs	
Metals (mg/kg)									
Arsenic	42	0	28.9	9.47	9.3	41	26	54	7.9
Barium	37	0	234	60.9	21000	100000	61000	20000	10000
Cadmium	37	26	1.28	0.75	9.8	140	28	42	22
Chromium	37	0	53.2	23.1	100000	100000	100000	27000	10000
Lead	42	3	577	42.1	200	440	420	460	200
Mercury	37	33	1.65	0.50	3.1	3.1	3.1	3.1	27
Volatile Organic Compounds (mg/kg)									
1,2,4-Trimethylbenzene	42	41	3.3	3.30	180	220	200	220	--
1,3,5-Trimethylbenzene	42	41	1.1	1.1	160	180	170	180	--
4-Isopropyltoluene	42	41	0.41	0.41	--	--	--	--	--
Isopropylbenzene	42	41	0.2	0.2	260	270	270	270	--
n-Butylbenzene	42	41	0.61	0.61	5400	80000	15000	34000	--
N-Propylbenzene	42	41	0.33	0.3	260	260	260	260	84
sec-Butylbenzene	42	41	0.33	0.33	11000	100000	30000	34000	--
Naphthalene	42	40	3.8	1.9	29	120	150	130	0.078
1,1,1-Trichloroethane	42	40	0.082	0.07	640	640	640	640	128
Acetone	42	41	0.059	0.1	96000	100000	100000	100000	47
Benzene	42	41	0.041	0.04	17	75	230	240	0.029
Ethylbenzene	42	41	0.38	0.4	86	380	400	470	0.22
Methyl ethyl ketone	42	40	0.012	0.01	20000	28000	25000	11000	5460
o-Xylene	42	41	0.49	0.5	260	260	260	260	2.5
Tetrachloroethene	42	41	0.13	0.13	120	160	150	84	0.76
Toluene	42	41	0.22	0.2	750	810	790	820	10
Xylene (Total)	42	41	1.3	1.30	260	260	260	260	2.5
m,p-Xylene	42	41	0.82	0.8	260	260	260	260	2.5

Table 2: Summary of Detected Soil Analytical Results

	Number of Samples	No. of Non-Detects	Maximum Detected Concentration	Average Concentration[1]	Soil Remedial Action Guidelines (mg/kg)[2]				ME DEP Chapter 418 Appendix A[3]
					Residential RAGs	Commercial Worker RAGs	Park User RAGs	Construction Worker RAGs	
Semivolatile Organic Compounds (mg/kg)									
Naphthalene	42	23	1.5	0.24	29	120	150	130	0.078
1-Methylnaphthalene	37	21	5.6	0.52	240	990	680	6000	--
2-Methylnaphthalene	42	24	10	0.81	330	4100	930	960	2.7
Acenaphthene	42	30	1.3	0.21	4900	62000	14000	48000	78
Acenaphthylene	42	27	1	0.2	4900	45000	14000	48000	74
Anthracene	42	21	2.6	0.33	25000	100000	70000	100000	825
Benz(a)anthracene	42	14	5.7	0.61	16	280	45	1700	13
Benzo(a)pyrene	42	15	6.4	0.75	1.6	29	4.5	9.9	1.3
Benzo(b)fluoranthene	42	11	6.2	0.75	16	290	45	1700	13
Benzo(g,h,i)perylene	42	18	3.2	0.52	2500	23000	7000	72000	2090
Benzo(k)fluoranthene	42	22	3.3	0.50	160	2900	450	17000	134
Carbazole	37	36	1.4	1.4	270	110	750	6700	317
Chrysene	42	13	5.6	0.76	1600	29000	4500	100000	1340
Dibenz(a,h)anthracene	42	27	0.53	0.13	1.6	29	4.5	170	1.3
Dibenzofuran	37	36	0.65	0.65	110	1600	300	1400	85
Fluoranthene	42	12	14	1.5	3300	41000	9300	24000	2790
Fluorene	42	27	1.1	0.20	3300	41000	9300	96000	75
Indeno(1,2,3-cd)pyrene	42	19	3.7	0.56	16	290	45	1700	13
Phenanthrene	42	14	11	1.2	2500	23000	7000	72000	83
Pyrene	42	12	11	1.3	2500	31000	7000	72000	2090

Table 2: Summary of Detected Soil Analytical Results

	Number of Samples	No. of Non-Detects	Maximum Detected Concentration	Average Concentration[1]	Soil Remedial Action Guidelines (mg/kg)[2]				ME DEP Chapter 418 Appendix A[3]
					Residential RAGs	Commercial Worker RAGs	Park User RAGs	Construction Worker RAGs	
Extractable Petroleum Hydrocarbons (mg/kg)									
C11-C22 Aromatics	42	12	730	88.4	2600	33000	7300	74000	230
C19-C36 Aliphatics	42	23	750	98.73	100000	100000	100000	1200000	10000
C9-C18 Aliphatics	42	33	379	63.40	2500	14000	17000	4800	1350
Volatile Petroleum Hydrocarbons (mg/kg)									
C9-C10 Aromatics	27	26	145	145.0	660	3500	4700	2600	37.5
C9-C12 Aliphatics	27	25	221	113.46	2500	14000	17000	2300	1350
Pesticides (mg/kg)									
4,4'-DDD	30	21	0.124	0.028	31	130	88	130	26
4,4'-DDE	30	20	1	0.12	27	130	79	100	23
4,4'-DDT	30	18	2.59	0.25	26	120	73	160	22
Dieldrin	30	29	0.014	0.014	0.46	2	1.3	12	0.4
Gamma-Chlordane	30	29	0.002	0.002	--	--	--	--	--
Polychlorinated biphenyls (PCBs) (mg/kg)									
Total PCBs	30	28	0.125	0.12	3.1	13	9.6	74	2.7
Aroclor-1254	30	29	0.125	0.13	--	--	--	--	--
Aroclor-1260	30	29	0.117	0.12	--	--	--	--	--

-- No standard available

1. 1/2 of the applicable laboratory reporting limit was used to calculate the average where non-detect data occurred.

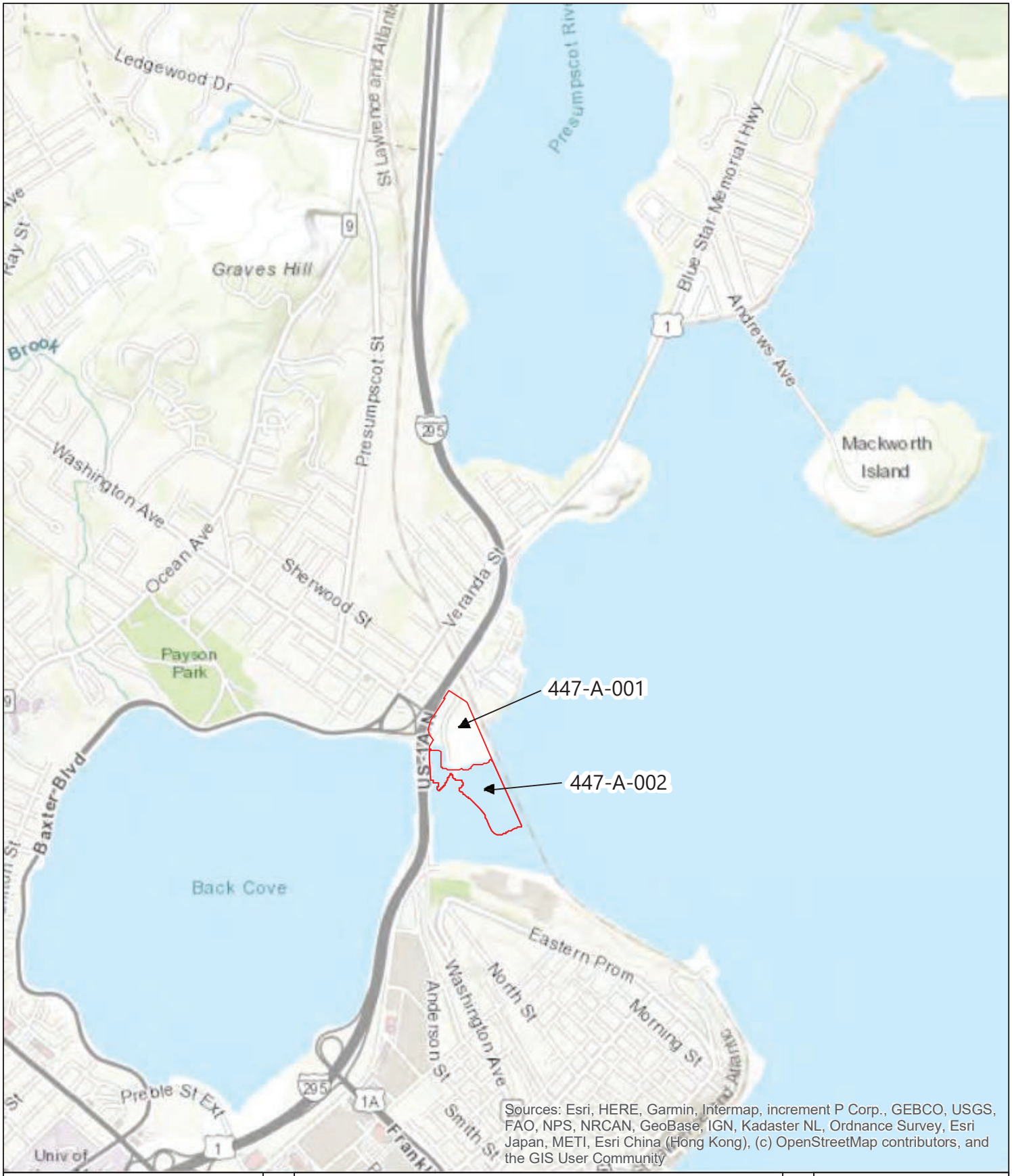
2. RAG: Maine Remedial Action Guidelines for Sites Contaminated with Hazardous Substances, MEDEP, Bureau of Remediation and Waste Management (revised November 15, 2023).

3. Maine Solid Waste Management Rules: Chapter 418 Beneficial Use of Solid Wastes, Appendix A: Screening Levels for Beneficial Use (revised July 8, 2018).

FIGURES

Figure 1: Site Location

Figure 2: Site Layout and Soil and Groundwater Sampling Locations



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Site Location

Roux Campus
Portland, Maine

Figure 1

Legend

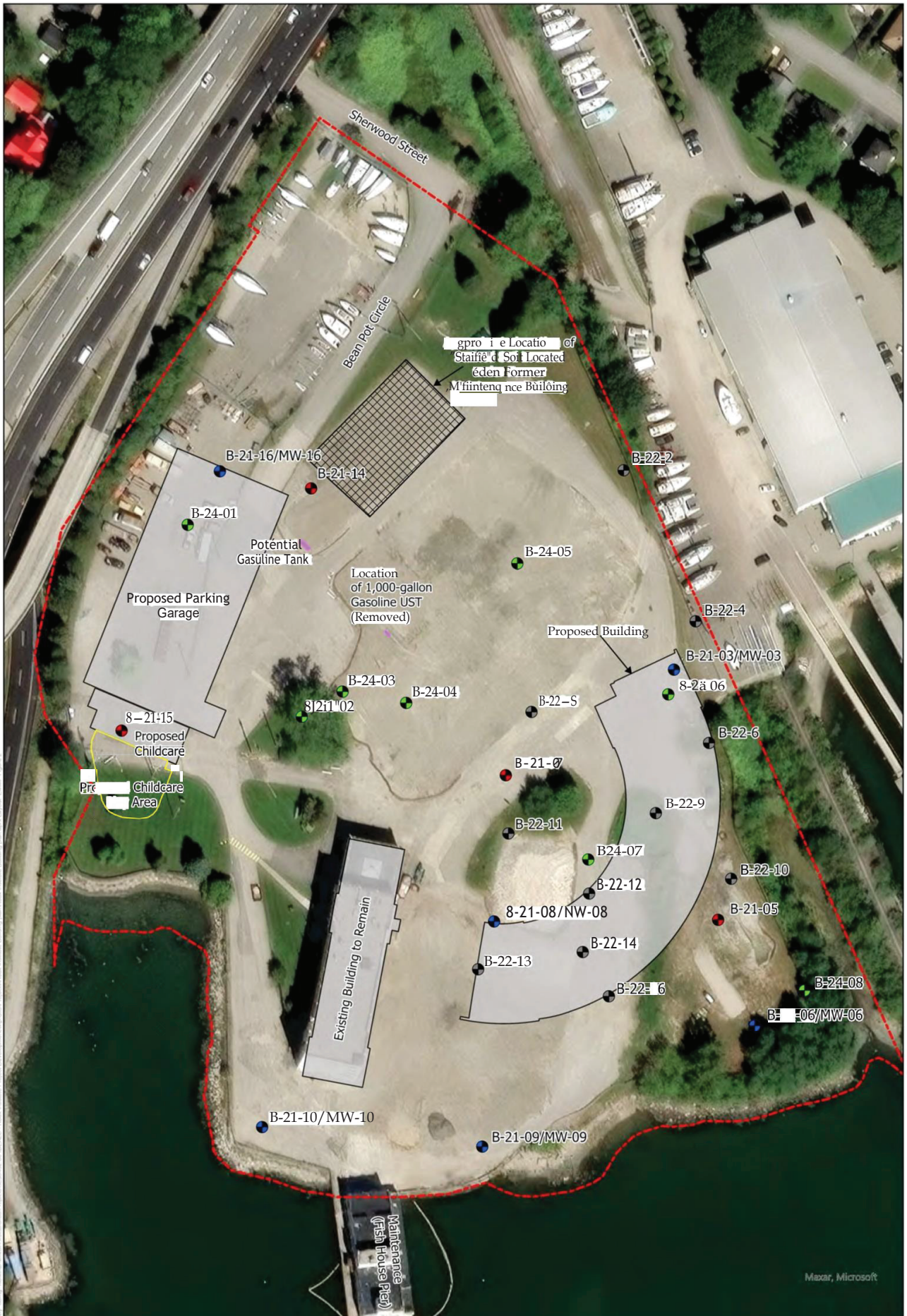
Site

0 0.25 0.5 1 Miles

Woodard & Curran

Pro ject #: 0233482.00
Map Cre ated: March 2024

Third Party GIS Disc laimer: This map is for reference and graphical purposes only and s hould not be relied upon by third parties for any legal decisions. Any reliance upon the map or data c ontained herein s hall be at the us ers' sole ris k. **Data So urces:**



Site Layout and Soil and Groundwater Sampling Locations
1 Bean Pot C male
Portland, Maine
Figure 2

Legend

- 2024 Soil Boring Location
- 2022 Soil Boring Location
- 2021 Soil Boring Location
- 2021 Soil Boring/Monitoring Well Location
- Site (Parcel ID 447-A-001)

0 30 60 120 Feet

N

Woodard • Curran

Project #: 0233482.00
Map Created April 2024

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. Data Sources:

APPENDIX A: EXAMPLE MAINE DEP NON-HAZARDOUS WASTE TRANSPORTER MANIFEST

CATEGORY

A

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTIOrl
NONHAZARDOUS WASTE TRANSPORTER, ,¿
MANIFEST

NONHAZARDOUS WASTE TRANSPORTER
DECAL NUMBER

155

GENERATOR (SOURCE)	WASTE TYPE
NAME	@ SPECIAL WASTE (specify)
ADDRESS	( ) SCRAP TIRES
TOWN PHONE	( ) CONSTRUCTION/DEMOLITION DEBRIS
TRANSPORTER	**DISPOSAL FACILITY OR SITE**
	CÓDE
NAME	NAME
ADDRESS	LOCATION
TOWN PHONE	PHONE
QUANTITY LOADED	QUANTITY RECEIVED
DATE LOADED.	DATE RECEIVED
DRIVER'S NAME	OPERATOR'S NAME
By signing this manifest form I certify that the information contained hefeln is true, co r0ct, and accurate to the best of my ability,	OPERATOR'S SIGNATURE
DRIVER'S SIGNATURE	DATE SIGNED
DATE SIGNED	Ses Instructions on the back of this form

OTHER INFORMATION:

8/94

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SECTION 401 - HOT MIX ASPHALT PAVEMENT

401.01 Description The Contractor shall furnish a uniformly blended, homogeneous mixture placed as one or more courses of Hot Mix Asphalt Pavement (HMA) using a single approved design for each item on an approved base in accordance with the contract documents and in reasonably close conformity with the lines, grades, thickness, and typical cross sections shown on the plans or established by the Resident. The Department will accept this work under Quality Assurance provisions, in accordance with these specifications and the requirements of Section 106 – Quality, the provisions of AASHTO M 323 except where otherwise noted in sections 401 and 703 of these specifications, and the MaineDOT Policies and Procedures for HMA Sampling and Testing.

401.02 Materials Materials shall meet the requirements specified in Section 700 - Materials:

Asphalt Cement	702.01
Aggregates for HMA Pavement	703.07
RAP for HMA Pavement	703.08
HMA Mixture Composition	703.09

401.03 Composition of Mixtures The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), approved antistrip, warm mix additive, and/or mineral filler if required. HMA shall be designed and tested according to AASHTO R 35 and the volumetric criteria in Table 1. The Contractor shall size, uniformly grade, and combine the aggregate fractions in proportions that provide a mixture meeting the grading requirements of the Job Mix Formula (JMF). Unless otherwise noted in Special Provision 403 - Hot Mix Asphalt Pavement, the design, verification, Quality Control, and Acceptance tests for this mix will be performed at 65 gyrations.

TABLE 1: VOLUMETRIC DESIGN CRITERIA

Design ESAL's (Millions)	**Required Density (Percent of G_{mm})**			**Voids in the Mineral Aggregate (VMA) (Minimum Percent)**					**Voids Filled with Binder (VFB) (Minimum %)**	**Fines/Eff. Binder Ratio**
				Nominal Maximum Aggregate Size (mm)						
	$N_{initial}$	**N_{design}**	**N_{max}**	**25.0**	**19.0**	**12.5**	**9.5**	**4.75**		
< 3.0	≤90.5	96.0	≤98.0	13.0	14.0	15.0	16.0	16.0	65-80*	0.6-1.2
3 to <10	≤89.0									
≥ 10										

*For 9.5 mm nominal maximum aggregate size mixtures, the maximum VFB is 82. For 4.75 mm nominal maximum aggregate size mixtures, the maximum VFB is 84.

The Contractor shall submit a JMF to the Department for each mixture to be supplied. The JMF will be approved by the Department in accordance with the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual. At the time of JMF submittal, the Contractor shall identify and make available the stockpiles of all proposed aggregates at the plant site. There must be a minimum of 150 ton for coarse aggregate stockpiles and 75 ton for fine aggregate stockpiles before

the JMF may be submitted. The Contractor shall provide aggregate samples to the Department unless otherwise required. The Contractor shall also make available to the Department the PGAB proposed for use in the mix in sufficient quantity to test the properties of the asphalt and to produce samples for testing of the mixture. The first day's production shall be monitored, and the approval may be withdrawn if the mixture exhibits undesirable characteristics such as checking, shoving or displacement. The Contractor shall be allowed to submit aim changes for a JMF as outlined in the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual: Mix Design Approval Section.

The Contractor shall submit a new JMF for approval each time a change in material source or materials properties is proposed. The same approval process shall be followed. The cold feed percentage of any aggregate may be adjusted up to 10 percentage points from the amount listed on the JMF, however no aggregate listed on the JMF shall be eliminated. The cold feed percentage for RAP may be reduced up to 10 percentage points from the amount listed on the JMF and shall not exceed the percentage of RAP approved in the JMF or for the specific application under any circumstances.

401.031 Warm Mix Technology The Contractor may place Hot Mix Asphalt Pavement produced with an accepted WMA technology if approved by the Department. Methods or technologies shall generally be at the Contractors option, but will be limited to proven, Agency and Industry accepted practice. Mixture production, placement and volumetric testing details, including temperatures, shall be included in the project specific QCP, and submitted to the Department for approval prior to any work.

401.04 Temperature Requirements The temperature of the mixture shall conform to the tolerances in Table 2 as measured at the truck at the mixing plant and at the paver unless otherwise authorized by the Department.

TABLE 2: ALLOWABLE TEMPERATURE RANGES

PGAB Grade(s)	Temperature Range (°F)
PG58-28 / PG64-28	275-325
PG64E-28 / PG70E-28	285-335

401.05 Performance Graded Asphalt Binder The Contractor shall utilize either a PG58-28, PG64-28, PG64E-28, PG70E-28, or other grade as specified in the 403 Special Provision. The Contractor shall utilize a PG64-28 if no liquid grade is specified within the 403 Special Provision.

401.06 Weather and Seasonal Limitations The State is divided into two paving zones as follows:

a. Zone 1 Areas north of US Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais.
b. Zone 2 Areas south of Zone 1 including the US Route 2 and Route 9 boundaries.

TABLE 3: SEASONAL AND TEMPERATURE LIMITATIONS

Description	Zone 1 Allowable Placement Dates	Zone 2 Allowable Placement Dates	Minimum Ambient Air Temperature
HMA Surface Course greater than or equal to 1" (Travelway)	May 1 to Saturday following October 1	April 15 to Saturday following October 15	50°F
HMA Surface Course less than 1" (Travelway)	May 15 to Saturday following September 15	May 15 to Saturday following October 1	
HMA Surface Course less than 1" considered to be "**Night Work**" (Travelway)	June 1 to the Saturday following September 1		
HMA Surface Course less than 1" (Shoulders)	May 15 to the Saturday following October 15		
HMA for Surface Course on **Bridge Decks**	May 1 to Saturday following October 1	April 15 to Saturday following October 15	
HMA for Base or Shim Course on **Bridge Decks**	April 15 to November 15		
HMA for use other than Travelway Surface Course (Shoulders greater than or equal to 1", Intermediate, Base, Shim)	April 15 to November 15		40°F
HMA for curb, driveways, sidewalks, islands, or other incidentals	N/A		
With Use of Approved Warm Mix Technology as Compaction Aid (Surface Course Ambient Air Temperature Allowances)			
HMA Surface Course greater than or equal to 1" (Travelway)	May 1 to Saturday following October 1	April 15 to Saturday following October 15	Begin at 50°F and pave **down to** 45°F
HMA Surface Course less than 1" (Travelway)	May 15 to Saturday following October 1	May 15 to Saturday following October 15	
HMA Surface Course less than 1" considered to be "**Night Work**" (Travelway)	June 1 to the Saturday following September 15		
HMA Surface Course less than 1" (Shoulders)	May 15 to the Saturday following October 15		
With Use of Approved Warm Mix Technology as Compaction Aid (Seasonal Limitation Extensions)			
HMA Surface Course greater than or equal to 1" (Travelway)	Saturday following October 1 to Saturday following October 15	Saturday following October 15 to Saturday following October 29	50°F
HMA Surface Course less than 1" (Shoulders)	Saturday following October 15 to Saturday following October 29		
HMA for use other than Travelway Surface Course (Shoulders greater than or equal to 1", Intermediate, Base, Shim)	April 15 to Saturday following November 15		35°F

1. Shoulders paved with the travelway pass shall meet travelway ambient air temperatures
2. Refer to the 461 SP for UTBWC for seasonal and temperature requirements.
3. The minimum ambient air temperature for placement of HMA for curbs, driveways, sidewalks, islands, and other incidental work shall be 40°F, regardless of whether the mixture is produced using an approved WMA technology.

The ambient air temperature shall be determined by an approved thermometer placed in the shade at the paving location. Unless otherwise specified, the Contractor shall not place Hot Mix Asphalt Pavement on a wet or frozen surface regardless of the ambient air temperature. The Hot Mix Asphalt Pavement produced with an approved WMA technology shall meet the requirements of section 401.04 - Temperature Requirements, unless otherwise approved by the Department. For the purposes of this Section, the traveled way includes truck lanes, ramps, approach roads and auxiliary lanes.

401.07 Hot Mix Asphalt Plant

401.071 General Requirements HMA plants shall conform to AASHTO M 156, Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures with exception of Section 4.2.1, 4.2.2, 4.3.4, 4.3.5, and 4.12.2.

All HMA plants will be inspected annually by the Department prior to producing HMA for Department projects. The Contractor shall provide the Department at least 72 hours' notice that the plant is ready for inspection. The Contractor shall equip the plant with ladders and platforms that are accessible and safe to obtain samples of PGAB, aggregate and mix from the relevant tanks, collector belts and haul units. Silo storage time of mixtures shall not exceed 36 hours.

401.072 Stockpiles The Contractor shall provide sufficient space for stockpiles and maintain a minimum of supply for 2 days production of all aggregate products used in MaineDOT approved mix designs currently under production. A minimum stockpile supply of 100 ton (70 yards) shall be maintained at all times. The Contractor shall construct stockpiles to prevent intermingling and to minimize segregation. All stockpiles used in MaineDOT mixes shall be identified with weatherproof signs at least 12" high and 24" wide, with reflective lettering at least 2" high.

401.073 Cold Feeds Cold Feed Bins will have bin dividers to keep aggregate products separated. Adequate means must be provided for obtaining samples of the combined flow of all Cold feed bins.

401.074 Dryer Dryer shall be capable of heating aggregate to required mixing temperature and shall be in good operation and condition. Dryer shall be subject to annual inspection prior to start-up. The Contractor shall dry and heat the aggregates for the HMA to the required temperature, adjusting flames to avoid damaging the aggregates. The Contractor shall provide the Department a minimum period of 72 hours to inspect the dryer and provide at least 24 hours' notice that the dryer is ready for inspection.

401.075 Asphalt Binder The plant shall include a heating system and insulation to maintain the asphalt binder at a uniform temperature for proper mixing and compaction. A thermometer shall be provided in the asphalt binder line. No direct flame may come in contact with tank. A sampling valve shall be provided in the circulation line downstream of any binder additive used unless otherwise approved by the Department. The Contractor shall drain down the asphalt as low as safely possible in any tank that will be switched to a new source or grade prior to adding the new PGAB.

401.076 Additives Additives (WMA, anti-strip, etc.) introduced into the binder at the HMA plant shall be introduced per the supplier's recommendations and shall be approved by the Department. The system for introducing additives shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all production rates and batch sizes. Additive introduction systems shall be controlled by a proportioning device to the amount required on the JMF plus or minus 0.1% of the target. Additive introduction systems shall be interlocked with the plant and the recordation (batch tickets or drum recordation) shall display the additive and the weight and percentage added. A means for sampling the PG binder with additive introduced will be provided. The sampling point shall be after the additive is mixed with the PGAB before entering the drum or mixer unit.

401.077 Batch Plants

Hot Bins Hot bins shall provide uniform continuous operation and be in good working condition. The plant shall be able to provide samples of hot bins upon request. Overflow shall be provided for each hot bin. Hot bin gates shall close without leaking. Bin walls must prevent intermingling between bins. Each hot bin shall have low level indicators which will alert the operator when the bin is empty.

Mixer Unit Clearance between blades and liner shall be 1" maximum, unless the aggregate exceeds 1 ¼" then the clearance shall be 1 ½". The spray bar length shall be at least 75% of the mixer length. The mixer unit shall be a twin pug mill-type mixer capable of mixing continuously for at least 45 seconds after all materials have been introduced into the mixer. The blades in the mixer shall be capable of producing a homogenous mixture. If the mixer is not enclosed, it shall be equipped with an adjustable hood to prevent loss of dust by dispersion. The mixer unit shall be subject to annual inspection prior to removal of safety features and being readied for service. The Contractor shall provide the Department the opportunity to inspect the mixer unit prior to the annual inspection. The Contractor shall provide the Department a minimum period of 72 hours to inspect the mixer unit and provide at least 24 hours' notice that the mixer unit is ready for inspection.

Mineral Filler Mineral filler and fiber shall utilize separate bins and feed systems to store and proportion the required quantity into the mixture. The feed systems shall be accurate to no more than 10% of the required weight with a convenient and accurate means of calibration. Mineral filler and fiber shall be introduced in the weigh hopper and uniformly distributed prior to the injection of the asphalt binder.

Automation The HMA batch plant shall automatically batch, mix and discharges mixes. The batch plant shall accurately proportion the various materials in the proper order by weight. The entire batching and mixing cycle shall be continuous and shall not require any manual operations. The batch plant shall use auxiliary interlock circuits to trigger an audible alarm whenever an error exceeding the acceptable tolerance occurs. Along with the alarm, the printer shall print an asterisk on the delivery slip in the same row containing the out-of-tolerance weight. The automatic proportioning system shall be capable of consistently delivering material within the full range of batch sizes. When RAP is being used, the plant must be capable of automatically compensating for the moisture content of the RAP.

The HMA batch plant shall be operated within the following tolerances:

Each aggregate component	+/- 1.5% cumulative, per bin
Mineral Filler	+/- 0.5%
Bituminous Material	+/- 0.1%
Zero return (aggregate)	+/- 0.5%
Zero Return (AC)	+/- 0.1%
Additives	+/- 0.1%

Recordation All plants shall be equipped with an approved digital recording device. The printer shall mark any weight on the ticket that exceeds tolerance. The delivery slip shall contain information required under Section 108.1.3 - Provisions Relating to Certain Measurements, Mass and paragraphs a, b, and c of Section 401.078.

401.078 Drum Plants

Cold Feeds and Delivery System A scalper screen shall be used to remove oversize material. The accuracy of the belt scale shall be within +/- 1.0% of the actual weight being measured. The plant shall be capable of correcting for aggregate moisture. Mineral filler and fiber shall utilize separate bin(s) and feeder systems to store and proportion the required quantity into the mixture. The feed systems shall be accurate to no more than +/- 10% of the required weight with a convenient and accurate means of calibration. The plant shall be equipped with a single control to change all feed rates. Mineral filler and fiber shall be introduced such that dry mixing is accomplished no less than 18 inches prior to the injection of the asphalt binder. The Contractor shall ensure that the mineral filler does not become entrained in the exhaust stream of the dryer.

Binder System The flow of asphalt binder shall adjust automatically with dry aggregate weights. The Department will conduct an asphalt flow meter check annually and after each change of plant location. The flow meter check must be performed prior to producing mix for Department projects. The plant must be configured to provide a convenient means to check accuracy of the flow meter. The flow meter will be considered accurate if the measured weight is within 1% of actual weight.
Drum Mixer The plant shall be equipped with a diversion system where mix can be diverted at startup/shutdown and any time. The drum mixer shall be subject to annual inspection prior to removal of safety features and being readied for service. The Contractor shall provide the Department a minimum period of 72 hours to inspect the drum mixer while providing at least 72 hours' notice that the drum mixer is ready for inspection.

Recordation An approved automatic ticket printer system shall be used to print delivery slips. The requirements for delivery slips for payment of materials measured by weight, as given in the following Sections, shall be waived: 108.1.3 a., 108.1.3 b., 108.1.3 c., and 108.1.3 d. The automatic printed ticket will be considered as the Weight Certificate. The dry aggregate weights and binder flow shall be recorded as well as mineral filler and all binder additives. The recordation of materials shall be printed a minimum of every ten minutes while in production.

The requirements of Section 108.1.3 f. - Delivery Slips, shall be met by the delivery slip printed by the automatic system, which accompanies each truckload, except for the following changes:

a. The quantity information required shall be individual weights of each batch or total net weigh of each truckload.
b. Signatures (legible initials acceptable) of Weighmaster (required only in the event of a malfunction as described in 401.074 c.).
c. The MaineDOT designation for the JMF.

401.079 Scales and Weight Checks Scales shall meeting the requirements of Section 108 - Payment. The scales shall be inspected and sealed by the State Sealer (or approved alternative) as often as the Department deems necessary to verify their accuracy. Plant scales shall be checked prior to the start of the paving season, and each time a plant is moved to a new location. Subsequent checks will be made as determined by the Resident. The Contractor will have at least ten 50 pound masses for scale testing at batch plants. At Contractor's option, the Contractor can use one single test weight that has been checked on sealed scales. This weight shall be 1,000 lbs. or greater. At least twice during each 5 days of production either of the following checks will be performed:

a. A loaded truck may be intercepted and weighed on a platform scale that has been sealed by the State Sealer of Weights and Measures within the past 12 months. The inspector will notify the producer to take corrective action on any discrepancy over 1.0%. The producer may continue to operate for 48 hours under the following conditions.
    1. If the discrepancy does not exceed 1.5%; payment will still be governed by the printed ticket.
    2. If the discrepancy exceeds 1.5%, the plant will be allowed to operate as long as payment is determined by truck platform scale net weight.

    If, after 48 hours the discrepancy has not been addressed and reduced below 1.0%, then plant operations will cease. Plant operation may resume after the discrepancy has been brought within 1.0%.
b. Where platform scales are not readily available, a check will be made to verify the accuracy and sensitivity of each scale within the normal weighing range and to assure that the interlocking devices and automatic printer system are functioning properly. If platform scales are not readily available, a weight with a known mass-verified and sealed annually by a licensed scale company, may be used by hanging weight from silo or surge hopper, at lower middle and upper third levels upon request to verify scale accuracy.
c. In the event of a malfunction of the automatic printer system, production may be continued without the use of platform truck scales for a period not to exceed the next two working days, providing total weights of each batch are recorded on weight tickets and certified by a Licensed Public Weighmaster.

401.08 Hauling Equipment Units hauling HMA shall have tight, clean, and smooth metal bodies, which have been thinly coated with a small amount of approved release agent to prevent the mixture from adhering to the bodies. Release agents that dissolve or strip asphalts, including diesel fuel, will not be allowed.

All mix haul units shall have a cover of water repellent material capable of heat retention, which completely covers the mixture. The cover shall be securely fastened on the truck, unless unloading. Haul units shall have an opening on both sides near the midpoint of the body, at least 12 in above the bed, which will accommodate a thermometer stem.

401.09 Pavers The Contractor shall use pavers meeting the requirements of this section unless otherwise authorized by the Department. Pavers shall meet the requirements of Table 4: Paver Requirements.

TABLE 4: PAVER REQUIREMENTS

Use	Paver Requirement
Traveled Way & Auxiliary Lanes	Equipped with a 10 ft minimum main screed with activated extensions. The minimum tractor weight shall be 30,000 pounds.
	Equipped with automatic grade and slope controls that automatically adjust the screed and increase or decrease the layer thickness to compensate for irregularities in the preceding course. The controls shall maintain the proper transverse slope and be readily adjustable so that transitions and superelevated curves can be properly paved. The controls shall operate from a fixed or moving reference such as a grade wire or ski type device (floating beam) with a minimum length of 30 ft, a non-contact grade control with a minimum span of 24 ft, except that a 40 ft reference shall be used on interstate and divided highway projects.
All HMA Placement	Self-contained, self-propelled units of sufficient class and size to place Hot Mix Asphalt Pavement in full lane widths specified in the contract on the main line, shoulder, or similar construction.
	Equipped with a free-floating activated heated main screed with activated extensions. Pavers with extendible screeds shall have auger extensions and tunnel extenders as per the manufacturer's recommendations, a copy of which shall be available if requested.
	Equipped with a receiving hopper with sufficient capacity for a uniform spreading operation and a distribution system to place the mixture uniformly, without segregation in front of the screed.
	Operated in such a manner as to produce a visually uniform surface texture and a thickness within the requirements of Section 401.11 - Surface Tolerances. The screed assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

The Contractor shall have the paver at the project site sufficiently before the start of paving operations to be inspected and approved by the Department. The Contractor shall repair or replace any paver found worn or defective, either before or during placement, to the satisfaction of the Department. Pavers that produce an unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA on MaineDOT projects. On a daily basis, the Contractor shall perform density testing across that mat as detailed in Section 401.191 Quality Control - Method A, B & C.

401.10 Rollers Rollers shall be static steel, pneumatic tire, oscillatory, or approved vibrator type. Rollers shall be in good mechanical condition, capable of starting and stopping smoothly, and be free from backlash when reversing direction. Rollers shall be equipped and operated in such a way as to prevent the picking up of hot mixed material by the roller drums or tires. Crushing of the aggregate or displacement of the HMA during rolling will not be permitted. Any HMA Pavement that becomes loose, broken, contaminated, shows an excess or deficiency of PGAB, or is in any other way defective shall be removed and replaced at no additional cost with fresh material which shall be immediately compacted to conform to the adjacent area.

The Contractor shall repair or replace any roller found to be worn or defective, either before or during placement, to the satisfaction of the Department. Rollers that produce grooved, unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA. The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option unless otherwise specified in the contract, provided specified density is attained and with the following requirements:

a. On variable-depth courses, the first lift of pavement over gravel, reclaimed pavement, on irregular or milled surfaces, or on bridges, at least one roller shall be 16 ton pneumatic-tired. Pneumatic-tired rollers shall be equipped with skirting to minimize the pickup of HMA materials from the paved surface. When required by the Resident, the roller shall be ballasted to 20 ton.
b. Compaction with a vibratory or steel wheel roller shall precede pneumatic-tired rolling, unless otherwise authorized by the Department.
c. Vibratory rollers shall not be operated in the vibratory mode on bridge decks.
d. Any method, which results in cracking or checking of the mat, will be discontinued and corrective action taken.
e. The use of an oscillating steel roller shall be required to compact all mixtures placed on bridge decks.

The maximum operating speed for a steel wheel or pneumatic roller shall not exceed the manufacturer's recommendations, a copy of which shall be available if requested.

401.11 Surface Tolerances The Department will check the following surface tolerances:

a. Longitudinally: The pavement surface profile shall be free of deviations in excess of +/- ¼ inches from the required pavement surface profile grade. To verify the surface tolerance a straight plane shall be established using 16 foot straight edge or a taught string line placed parallel to the direction of travel and checked continuously across the width of the lane.
b. Transversely: The pavement surface profile shall be free of deviations in excess of 0 inches below and ¼ inches above the required cross-sectional profile grade. To verify the surface tolerance a straight plane shall be established using a 10 foot straight edge or taught string line placed perpendicular to the direction of travel and checked continuously along the length of the lane.

The Contractor shall correct defective areas by removing defective work and replacing it with new material as directed by the Department. The Contractor shall furnish a 10 foot straightedge for the Department's use.

401.12 Preparation of Existing Surface The Contractor shall thoroughly clean the surface upon which Hot Mix Asphalt Pavement is to be placed of all objectionable material. When the surface of the existing base or pavement is irregular, the Contractor shall bring it to uniform grade and cross section. All surfaces shall have a tack coat applied prior to placing any new HMA course.

When covering portland cement concrete surfaces (concrete slabs or concrete backfill), as a minimum, a triple application of tack coat shall be applied on the surface prior to pavement being placed over the concrete.

Tack coat shall conform to the requirements of Section 409 – Bituminous Tack Coat, Section 702 – Bituminous Material, and all applicable sections of the contract.

401.13 Spreading and Finishing In areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the Contractor shall spread, rake, and lute the HMA with hand tools to provide the required compacted thickness. Release agents that dissolve or strip asphalts, including diesel fuel, will not be allowed. On roadways with adjoining lanes carrying traffic, the Contractor shall place each course per the conditions in Table 5, unless otherwise noted by the Department in Section 403 - Hot Mix Asphalt Pavement.

TABLE 5: PLACEMENT CONDITIONS FOR ADJOINING LANES

Depth (at centerline)	Placement Conditions
Vertical Longitudinal Joint	
¾" and less (incl. shim)	The Contractor may place the HMA course over the full single travel lane width for each production day.
1" to 1 ¼"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before weekend or holiday suspension. A maximum unmatched centerline joint of the project's 1 days' average production will be permitted over the weekend.
1 ½" to 2"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before the end of the following calendar day.
Greater than 2"	The Contractor shall place each course over the full width of the traveled way section being paved that day.
Notched-Wedge Longitudinal Joint	
1 ½" to 2"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before weekend or holiday suspension. A maximum unmatched centerline joint of the project's 1 days' average production will be permitted over the weekend.
Greater than 2"	The Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before the end of the following calendar day.
Longitudinal Joints (<45 mph) *	
Greater than 2"	With use of a Notch-Wedge device, the Contractor may place the HMA course over the full single travel lane width for each production day and will be required to place a matching course of HMA over the adjacent section of travel lane before weekend or holiday suspension. A maximum unmatched centerline joint of the project's 1 days' average production will be permitted over the weekend.

* Longitudinal joint allowances for segments under 45 mph will only be permitted if the segment length is continuous for one mile or greater or the total length of the project is one mile or less.

Constructed wedge joints that degrade or break off will not qualify for the open joint duration as described above. The impacted area shall be matched up within 48 hours of notification by the Department. Prior to matching, the Contractor shall trim off the impacted area and construct a vertical joint. Failure to comply will result in an automatic Traffic Control Violation as per section 652.8.

The Contractor shall place the specified course over the full width of the mainline traveled way being paved, regardless of use, depth, or longitudinal joint type prior to Memorial Day, July 4th, Labor Day, paving suspensions exceeding three days, or other dates as specified by special provision.

The Contractor shall install additional warning signage that clearly defines the centerline elevation differential hazard. Unless otherwise addressed in the contract, the Contractor shall install additional centerline delineation such as a double application of raised pavement markers at 100 foot intervals, or temporary painted line. For any exposed vertical edge between the shoulder and traveled way, at a minimum, the use of temporary painted line, or RPMs placed along the edge of traveled way at 200 foot intervals is required. The Traffic Control Plan shall be amended to include this option and the additional requirements. All signs and traffic control devices will conform to Section 719.01, and Section 652, and will be installed prior to the work, at a maximum spacing of 0.50 mile for the entire length of effected roadway section. If this option is utilized, all additional signing, labor, traffic control devices, or incidentals will not be paid for directly, will be considered incidental to the appropriate 652 items.

When covering a portland cement concrete surface (concrete slabs or concrete backfill) a minimum of 3 inches of HMA pavement will be required over the concrete.

401.14 Hot Mix Asphalt Placement on Bridge Decks Hot mix asphalt pavement placed on bridges shall also conform to Section 508.04 and the following requirements:

a. The minimum production and placement temperature for the Hot Mix Asphalt placed over membrane shall conform to the manufacturer's recommendations.
b. The bottom course shall be placed with an approved rubber mounted paver of such type and operated in such a manner that the membrane waterproofing will not be damaged in any way.
c. The top course shall not be placed until the bottom course has cooled sufficiently to provide stability.
d. The Contractor will not be required to cut sample cores from the compacted pavement on the bridge deck, unless otherwise directed by Special Provision.
e. After the top course has been placed, the shoulder areas shall be sealed 3 ft wide with two applications of an emulsified bituminous sealer meeting the requirements of Section 612.03 - Sealing and Section 702.12 - Emulsified Bituminous Sealing Compound. The first application shall be pre-mixed with fine, sharp sand, similar to mortar sand, as needed to fill all voids in the mix in the area being sealed. The second application may be applied without sand. The sealer shall be carried to the curb at the gutter line in sufficient quantity to leave a bead or fillet of material at the face of the curb. The area to be sealed shall be clean, dry and the surface shall be at ambient temperature. The furnishing and applying of the required quantity of sealer for the bridge shoulder areas shall be incidental to placing the hot mix asphalt pavement.
f. The area between the edge of the membrane and the vertical surface of bridge curbing and concrete bridge headers shall be completely sealed with hot-applied asphaltsealant material, meeting the requirements of Type 4 or mastic crack seal. Sealant shall be applied to form a complete seal between the membrane and the vertical surface and shall extend up the vertical surface to within ½ inch of the top of the HMA wearing surface. This work shall be considered incidental to the contract pavement items unless 508 membrane items are included in the contract.

401.15 Compaction Immediately after the Hot Mix Asphalt Pavement has been spread, struck off, and any surface irregularities adjusted, the Contractor shall thoroughly and uniformly compact the HMA by rolling.

The Contractor shall roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving. The Contractor shall prevent adhesion of the HMA to the rollers or vibrating compactors without the use of fuel oil or other petroleum-based release agents. Solvents designed to strip asphalt binders from aggregates will not be permitted as release agents on equipment, tools, or pavement surfaces.

The Contractor shall immediately correct any displacement occurring as a result of the reversing of the direction of a roller or from other causes to the satisfaction of the Department. Any operation other than placement of variable depth shim course that results in breakdown of the aggregate shall be discontinued. Any new pavement that shows obvious cracking, checking, or displacement shall be removed and replaced for the full lane width as directed by the Resident at no cost to the Department.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, the Contractor shall thoroughly compact the HMA with mechanical vibrating compactors. The Contractor shall only use hand tamping in areas inaccessible to all other compaction equipment. On depressed areas, the Contractor may use a trench roller or cleated compression strips under a roller to transmit compression to the depressed area.

Any HMA that becomes unacceptable due to cooling, cracking, checking, segregation or deformation as a result of an interruption in mix delivery shall be removed and replaced with material that meets contract specifications at no cost to the Department.

For all items requiring pavement density testing, the Contractor shall cut 6-inch diameter cores at no additional cost to the Department by the end of the working day following paving. Cores shall be cut such that the nearest edge at least 9 inches from any joint. Pre-testing of the cores will not be allowed. If the Contractor and the Department mutually determine that a core is damaged, the Contractor shall cut new core(s) at the same offset and within 3 ft of the initial sample. The Contractor and the Department will mutually determine if underlying material is adhered to the core and if so will mark the core at the point where sawing is needed. The Department will place the cores in a secure container and the Contractor shall transport the cores to the designated MaineDOT lab. The cores will be saw cut by the Department to remove underlying layers. No recuts are allowed at a test location after the core has been tested.

On all sections of overlay with wearing courses designed to be 1 in or less in thickness, there shall be no pay adjustment for density otherwise noted in Section 403 - Hot Mix Asphalt Pavement. For overlays designed to be 1 in or less in thickness, density shall be obtained by the same rolling train and methods as used on mainline travelway surface courses with a pay adjustment for density, unless otherwise directed by the Department.

There shall be no pay adjustment for density on shoulders unless otherwise noted in Section 403 - Hot Mix Asphalt Pavement. Density for shoulders shall be obtained by the same rolling train and methods as used on mainline travelway, unless otherwise directed by the Department. Efforts to obtain optimum compaction will not be waived by the Department unless it is apparent during construction that local conditions make densification to this point detrimental to the finished pavement surface course.

401.16 Joints The Contractor shall construct wearing course transverse and longitudinal joints in such a manner that minimum tolerances shown in Section 401.11 - Surface Tolerances are met when measured with a straightedge. The paver screed shall maintain a uniform head of HMA during transverse and longitudinal joint construction. The HMA shall be free of segregation and meet temperature requirements outlined in Section 401.04. Transverse joints of the wearing course shall be straight and neatly trimmed. The Contractor may form a vertical face exposing the full depth of the course by inserting a header, by breaking the bond with the underlying course, or by cutting back with hand tools. The Contractor shall apply a coating of emulsified asphalt immediately before paving all joints to the vertical face and 3 in of the adjacent portion of any pavement being overlaid except those formed by pavers operating in echelon. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Department may approve application by a brush for small surfaces, or in the event of a malfunction of the spray apparatus, but for a period of not more than one working day.

Where pavement under this contract joins an existing pavement, or when the Department directs, the Contractor shall cut the existing pavement along a smooth line, producing a neat, even, vertical joint. The Department will not permit broken or raveled edges. The cost of all work necessary for the preparation of joints is incidental to related contract pay items. Longitudinal joints shall be generally straight to the line of travel and constructed in a manner that best ensure joint integrity. Methods or activities that prove detrimental to the construction of straight, sound longitudinal joints will be discontinued.

The Contractor may utilize an approved notched wedge joint device on all HMA layers 1 ½ inches in depth or greater. A notched wedge joint shall be constructed as shown in Figure 1 using a device that is attached to the paver screed and is capable of independently adjusting the top and bottom vertical notches.

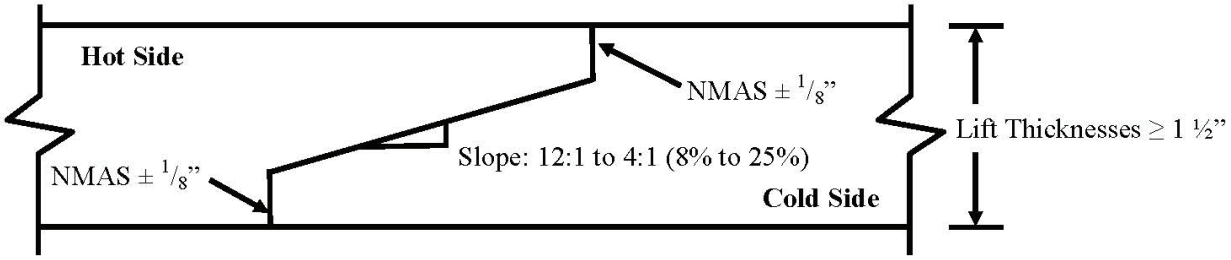


FIGURE 1: Notched Wedge Joint

Notes
1. An emulsified tack coat shall be applied to the vertical edges and the wedge surface so that the total rate is 0.05 G/SY plus the normal specified rate prior to placing the adjacent layer. The Contractor may elect to apply the emulsified tack coat in one or multiple passes.
2. Dimensions shown are compacted depths (after rolling is complete).

The Department reserves the right to have centerline cores cut by the Contractor's QC personnel for informational purposes to monitor the density along the joint. Informational cores at the centerline joint will be taken centered over the tapered part of the wedge joint.

Any notched wedge joint constructed areas that become cracked or broken shall be trimmed back to the limits affected prior to placing the adjoining lane. Any materials that become unbound or separated from the wedge or tapered joint section, or contaminated by materials determined by the Department as being detrimental to the construction of a sound construction joint, shall be removed by sweeping, compressed air and lance, or by hand tools as required. This work, if necessary, will not be paid for directly, but shall be considered incidental to the related contract items.

The Contractor shall apply a coating of emulsified asphalt on the vertical and tapered surface of the longitudinal centerline joint immediately before paving if the notched wedge joint device is used.

The total rate of application shall be 0.050 G/SY plus the normal specified tack coat rate. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Department may approve application by a brush for small surfaces.

401.17 Hot Mix Asphalt Documentation The Contractor and the Department shall agree on the amount of Hot Mix Asphalt Pavement that has been placed each day. All delivery slips shall conform to the requirements of 401.078.

401.18 Prepave Meeting Prior to placing any mix, the Department and the Contractor shall hold a Pre-paving conference to discuss the paving schedule, source of mix, type and amount of equipment to be used, sequence of paving pattern, rate of mix supply, random sampling, project lots and sublots and traffic control. A copy of the density QC random numbers to be used on the project shall be provided to the Resident. The Departments' random numbers for Acceptance testing shall be generated and on file with the Resident and the Project Manager. All personnel of the Department and the Contractor who have significant information relevant to the paving items shall attend, including the responsible onsite paving supervisor for the Contractor. The Resident will prepare minutes of the conference and distribute them to all attendees. Any requests to revise the minutes must be made to the Resident within 7 Days of Receipt. These minutes will constitute the final record of the Pre-paving conference. On the first day of paving and whenever there is a change in the onsite paving foreman or paving inspector, the Department and the Contractor shall hold an informal onsite meeting to review the minutes of the Pre-paving conference, Project Specific QCP, Plans, Typicals, Special Provisions and communication process. This meeting shall be held prior to placing any mix and, at minimum, shall occur yearly for multi-year contracts. The onsite paving supervisor, QCT, Superintendent, Resident and/or paving inspector shall attend.

401.19 Contractor Quality Control – Method A, B, C & D
The Contractor shall operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the contract requirements. The Contractor shall not begin paving operations until the Department approves the QCP in writing.

401.191 Quality Control The QCP shall meet the requirements of Section 106.6 – Acceptance and this Section. The QCP shall address any items that affect the quality of the Hot Mix Asphalt Pavement, and shall include the following personnel meeting these minimum requirements:

a. QCP Administrator – The QCP Administrator must be a full-time employee of or a consultant engaged by the Contractor or paving subcontractor. The QCP Administrator shall have full authority to institute any and all actions necessary for the successful operation of the QCP. The QCP Administrator (or their designee in the QCP Administrator's absence) shall be available to communicate with the Department at all times.

- For items accepted under Methods A and B, the QCP Administrator shall be certified as a Quality Assurance Technologist (QAT) by NETTCP.
- For items accepted under Methods C and D, the QCP Administrator shall be certified by NETTCP as a Quality Assurance Technologist (QAT), Plant Technician, or Paving Inspector.

b. Process Control Technician(s) (PCT) shall utilize test results and other quality control practices to assure the quality of aggregates and other mix components and control proportioning to meet the JMF(s). The PCT shall inspect all equipment used in mixing to assure it is operating properly and that mixing conforms to the mix design(s) and other Contract requirements, and that delivery slips and plant recordation accurately reflects the mix being produced with all the required information. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one PCT is required. The Plan shall include the criteria to be utilized by the PCT to correct or reject unsatisfactory materials. The PCT shall be certified as a Plant Technician by the NETTCP.

c. Quality Control Technician(s) (QCT) shall perform and utilize quality control tests at the job site to assure that delivered materials meet the requirements of the JMF(s). The QCT shall inspect all equipment utilized in transporting, laydown, and compacting to assure it is operating properly and that all laydown and compaction conform to the Contract requirements. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one QCT is required. The QCP shall include the criteria utilized by the QCT to correct or reject unsatisfactory materials. The QCT shall be certified as a Paving Inspector by the NETTCP.

The QCP shall detail the coordination of the activities of the Plan Administrator, the PCT and the QCT. The Project Superintendent shall be named in the QCP, and the responsibilities for successful implementation of the QCP shall be outlined.

The QCP shall address any items that affect the quality of the Hot Mix Asphalt Pavement including, but not limited to, the following:

a. <u>General Requirements:</u>

- Job Mix Formulas (JMFs)
- Name of QCP Administrator, and certification number
- Description of corrective action process
- Disposition of defective material
- A procedure to take immediate possession of acceptance samples once released by MaineDOT and deliver said samples to the designated acceptance laboratory.
- Type of release agent to be used on haul units, tools and rollers.
- A note stating that the use of petroleum-based fuel oils, such as diesel or kerosene, or asphalt stripping solvents will not be permitted.

b. Process Control Requirements: Each Hot Mix Asphalt plant shall have a Plant Specific Process Control Plan. At minimum the plan shall include:

- Name of Plant Specific Process Control Technician(s) and certification number(s)
- Hot mix asphalt plant details
- Stockpile Management
- Mixing & transportation
- Silo management and details
- A detailed description of RAP processing, stockpiling and introduction into the plant
- PG Binder management:
  - Tanks and storage (including polymer modified binders if applicable)
  - Binder temperature
  - Sample points
  - Method to ensure mixture contains the specified binder grade
  - Additive introduction details if introduced at the plant
- Testing and inspection plan for control of aggregates and RAP
- Mix Testing and inspection plan

c. Quality Control Requirements – Method A & B:

- Name of Quality Control Technicians(s) and certification number(s)
- Laydown operations
- Longitudinal joint construction including the tacking of all joints.
- Procedures for avoiding paving in inclement weather
- Compaction of shoulders
- Methods to ensure that segregation is minimized
- Procedures to determine the maximum rolling and paving speeds based on best engineering practices and past experience in achieving acceptable pavement smoothness.
- Sequence for paving around drainage structures, under guard rail, around curb, at bridges, intersections, drives and minor approaches to ensure proper compaction, finish, and drainage.

d. Quality Control Requirements – Method C and D:

- Name of QCP Administrator and certification number(s) as specified in Section 401.19.
- Name of Process Control Technicians(s) and certification number(s).
- Name of Quality Control Technicians(s) and certification number(s).
- Anticipated Compaction Temperature Zones for each roller zoneduring placement.
- Mix TMD to be used for density gauge setting for method spec density work
- Procedures for avoiding paving in inclement weather.

The Contractor shall also supply a Laydown Operation Plan that addresses sequence of work, layout of work, longitudinal joint construction, compaction of shoulders, methods to minimize segregation, and procedures to achieve acceptable pavement smoothness.

For each production day, a summary of each day's results, including a daily paving report, summarizing the mixture type, mixture temperature, equipment used, environmental conditions, and the number of roller passes, shall be recorded and signed by the QCT and presented to the Department's representative by 1 PM the following working day.

Unless otherwise noted in Section 403 – Hot Mix Asphalt Pavement, the Contractor shall submit a modified QC Plan every year detailing, how the mix is to be placed, what equipment is to be used, and what HMA plant is to be used for Items covered under the Plan. All mix designs (JMF) shall be approved and verified by MaineDOT prior to use.

The Contractor shall certify the mix and the test results for each item by a Certificate of Compliance.

The Contractor shall have a testing lab at the plant site, equipped with all testing equipment necessary to complete the tests in Table 6. The Contractor shall generate QC sampling random numbers for each approved mix design every year. A copy of the random numbers shall be emailed to the QC.mainedot@maine.gov email address and remain on-file (in print) and be available for inspection at the QC laboratory. The Contractor shall sample, test, and evaluate Hot Mix Asphalt Pavement in accordance with the minimum frequencies per each approved mix design.

TABLE 6: MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Temperature of mix	6 per day at street and plant	-
Temperature of mat	4 per day	-
%TMD (In-Place Density - Surface)	1 per 125 ton	AASHTO T 355 or AASHTO T 343
%TMD (In-Place Density - Base)	1 per 250 ton	AASHTO T 355 or AASHTO T 343
Fines / Effective Binder	1 per 500 ton	AASHTO T 312*
Gradation	1 per 500 ton	AASHTO T 30
PGAB Content	1 per 500 ton	AASHTO T 164 or AASHTO T 308
Voids at N_{design}	1 per 500 ton	AASHTO T 312*
VMA at N_{design}	1 per 500 ton	AASHTO T 312*
Rice Specific Gravity	1 per 500 ton	AASHTO T 209
Percent Fractured Particles	1 per 5,000 ton	AASHTO T 335
Flat and Elongated Particles	1 Per 5,000 ton	ASTM D4791
Fine Aggregate Angularity	1 Per 5,000 ton	AASHTO T 304

The Contractor shall monitor plant production on each approved mix design using running average of three control charts as specified in Section 106 - Quality. Control limits shall be as noted in Table 7 below. The UCL and LCL, shall not exceed the allowable gradation control points for the particular type of mixture as outlined in Table 1 of Section 703.09.

TABLE 7: CONTROL LIMITS

Property	UCL and LCL
Percent Passing 4.75 mm and larger sieves	Target +/- 4.0
Percent Passing 2.36 mm sieve	Target +/- 2.5
Percent Passing 0.075 mm sieve	Target +/- 1.0
PGAB Content	Target +/- 0.25
VMA at N_{design}	LCL = LSL + 0.2
Voids at N_{design}	JMF Target +/- 1.2
Theoretical Maximum Specific Gravity	JMF Target +/- 0.020

The Contractor shall submit all QC test and inspection reports and updated control charts to the Resident and QC.mainedot@maine.gov by email. The reports and updated control charts shall be signed by the appropriate technician and be submitted to the Department by 1:00 P.M. on the next working day, except when otherwise noted in the QCP and approved by the Department.

The Contractor shall also retain splits of the previous 5 QC tests, with QC results enclosed for random selection and testing by the Department. Test results of splits that do not meet the Dispute Resolution

Variance Limits in Table 18 shall trigger an investigation by the MaineDOT Independent Assurance Unit and may result in that lab losing NETTCP certification and the ability to request a dispute [Section 401.50 - Process for Dispute Resolution].

The Contractor shall make density test results, including randomly sampled densities, available to the Department onsite. Summaries of each day's results, including a daily paving report summarizing the mixture type, mixture temperature, equipment used, environmental conditions, and the number of roller passes, shall be recorded and signed by the QCT and provided to the QC.mainedot@maine.gov email address and Resident in writing by 1:00 p.m. the next working day. The Contractor shall fill all holes in the pavement resulting from cutting cores by the Contractor or the Department with a properly compacted, acceptable mixture no later than the following working day. Before filling, the Contractor shall carefully clean the holes and apply a coating of emulsified asphalt. The Contractor may only cut additional cores for verification of the densometer, at a rate not to exceed 3 per day or 2 per 1000 ton placed.

If the Contractor’s control chart shows the process for a given mix design to be out of control (defined as a single point outside of the control limits on the running average of three chart) on any property listed in Table 7: Control Limits, the Contractor shall notify the Resident of all affected projects in writing of the corrective action by 1:00 PM the next working day. The written description shall detail what action is being taken by the Contractor to bring the property in question back within control limits. Subsequent quality control results are expected to demonstrate an improvement and regression towards the aim. The Department reserves the right to take action, to include cessation of production, in the case of repeated results outside the Table 7 control chart control limits.

On a daily basis, or whenever equipment type or sequence is modified, the Contractor shall perform density testing across the mat being placed, prior to being compacted by equipment at 12 in intervals. If the density values vary by more than 2.0% from the mean, the Contractor shall make adjustments to the screed until the inconsistencies are remedied. Failure to replace or repair defective placement equipment may result in a letter of suspension of work and notification of a quality control violation resulting in possible monetary penalties as governed by Section 106 – Quality.

The Contractor shall cease paving operations whenever one of the following occurs:

a. The quality level for density using all quality control tests for the current Lot is less than 60 PWL.
b. The Coarse Aggregate Angularity or Fine Aggregate Angularity value falls below the requirements of Section 703.07, Table 3: Aggregate Consensus Properties Criteria for the design traffic level.
c. The Flat and Elongated Particles value exceeds 10% by ASTM D4791.
d. There is any visible damage to the aggregate due to over-densification other than on variable depth shim courses.
e. The Contractor fails to follow the approved QCP.

The Contractor shall notify the Resident in writing as to the reason for shutdown, as well as the corrective action, by the end of the workday. Failure to do so will be treated as a second incident under 106.4.6 QCP Non-compliance. The Department will only allow the continuation of paving operations when it is satisfied the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production. The Department

retains the exclusive right, with the exception of the first day's production of a new JMF, to determine whether the resumption of production involves a significant change to the production process. If the Department so determines, then the current lot will be terminated, a pay factor established, and a new lot will begin.

The Contractor may utilize innovative equipment or techniques not addressed by the Contract documents to produce or monitor the production of the mix, subject to approval by the Department.

401.192 Quality Control and Acceptance for Item 403.209 Hot Mix Asphalt, 9.5 mm Nominal Maximum Size, (sidewalks, drives, islands & incidentals) and visual acceptance items Item 403.209 will be accepted under method D acceptance unless otherwise noted in the 403 special provision. A QCP, certified QC personnel, or Prepave Meeting shall not be required for Item 403.209 - Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (sidewalks, drives, islands & incidentals) when accepted under either visual acceptance or under Method D acceptance unless otherwise specified in the 403 SP. An approved JMF shall be provided to the Resident prior to placement.

401.20 Acceptance Method A & C These methods utilize Quality Level Analysis and pay factor specifications. For Hot Mix Asphalt Pavement designated for acceptance under Quality Assurance provisions, the Department will sample once per sublot on a statistically random basis, test, and evaluate in accordance with the Acceptance Properties as outlined in Table 8:

TABLE 8: ACCEPTANCE PROPERTIES – METHOD A & C

Properties	**Point of Sampling**	**Test Method**
Gradation	Paver Hopper	AASHTO T 30
PGAB Content	Paver Hopper	AASHTO T 308
% TMD (In-Place Density)	Mat behind all Rollers	AASHTO T 269
Voids at N_{design}	Paver Hopper	AASHTO T 312
VMA at N_{design}	Paver Hopper	AASHTO T 312
Fines to Effective Binder	Paver Hopper	AASHTO T 312
VFB	Paver Hopper	AASHTO T 312

The Department will obtain samples of Hot Mix Asphalt Pavement in conformance with AASHTO R 97, Sampling Asphalt Mixtures, and the MaineDOT Policies and Procedures for HMA Sampling and Testing. The Contractor shall transport the samples in containers provided by the Department to the designated MaineDOT Laboratory within 48 hours except when otherwise noted in the project specific QCP or as directed by the Resident. Failure to deliver an acceptance sample to the designated acceptance laboratory will be considered the second incident under 106.4.6–QCP Non-Compliance.

Target values shall be as specified in the JMF. The Department will withhold reporting of the test results for the Acceptance sample until 7:00 AM, on the second working day of receipt of the sample, or after receipt of the Contractors results of the Acceptance sample split. Upon conclusion of each lot being evaluated under quality level analysis, where there is a minimum of four sublots, results shall be examined for statistical outliers, as stated in Section 106.7.2 - Statistical Outliers.

Lot sizes and sublot sizes shall be determined as outlined in Table 9.

TABLE 9: LOT AND SUBLOT SIZES – METHOD A & C

Lot Size*	Entire production per item per contract per year up to 6000 ton
Maximum Sublot Size – Mix	750 ton
Maximum Sublot Size – Density	Surface Layers – 250 ton Base / Intermediate Layers – 500 ton
Minimum Number of Samples – Mix	Four
Minimum Number of Samples – Density	Five

*General – Lot and Sublot size may be adjusted to accommodate the work scope and schedule, or as otherwise agreed upon at the Prepave Meeting

If there is less than one-half of a sublot remaining at the end of production for the year, then it shall be combined with the previous sublot. If there is more than one-half sublot remaining at the end of production for the year, then it shall constitute the last sublot and shall be represented by test results. If it becomes apparent partway through a Lot that, due to an underrun, there will be insufficient mix quantity to obtain the minimum number of sublots needed, the Resident may adjust the size of the remaining sublots and select new sample locations based on the estimated quantity of material remaining in the Lot. Unanticipated over-runs of up to 1500 ton shall be rolled into the last lot. Cases where the lot is terminated prior to reaching completion shall be handled in accordance with Section 106.7.3 Early Termination of Lots. In cases where a density incentive/disincentive provision apply, additional cores shall be taken to attain a minimum of three for the Lot.

Isolated Areas During the course of inspection, should it appear that there is an isolated area that is not representative of the lot based on a lack of observed compactive effort, excessive segregation, a change in process or any other questionable practice, that area may be isolated and tested separately.

An area so isolated that has a calculated pay factor below 0.80 for Method A, based on three random tests shall be removed and replaced at the expense of the Contractor for the full lane width and a length not to be less than 150 ft.

TABLE 10: ACCEPTANCE LIMITS – METHOD A & C

Property	USL and LSL	
	Method A	Method C
Percent Passing 4.75 mm and larger sieves	Target +/- 7%	Target +/- 7%
Percent Passing 2.36 mm to 1.18 mm sieves	Target +/- 4%	Target +/- 5%
Percent Passing 0.60 mm sieve	Target +/- 3%	Target +/- 4%
Percent Passing 0.30 mm to 0.075 mm sieve	Target +/- 2%	Target +/- 2%
PGAB Content	Target +/- 0.4%	Target +/- 0.4%
Voids at N_{design}	4.0% +/- 1.5%	N/A
Fines to Effective Binder	0.9 +/- 0.3	N/A
VMA at N_{design}	LSL from Table 1	N/A
VFB	Table 1 plus a 4% production tolerance for USL	N/A
% TMD (In-place Density)	94.5% +/- 2.5%	94.5% +/- 2.5%

Cease Production The Contractor shall cease paving operations whenever one of the following occurs on a lot in progress:

TABLE 11: CEASE PRODUCTION – METHOD A & C

Property	Percent Within Limits (PWL)	
	Method A	Method C
Percent Passing NMAS sieve*	<60 PWL	<60 PWL
Percent Passing 2.36 mm sieve*		
Percent Passing 0.30 mm sieve*		
Percent Passing 0.075 mm sieve*		
PGAB Content		
Voids at N_{design}		N/A
Fines to Effective Binder*		
VMA at N_{design}		
VFB		
% TMD (In-place Density)		<60 PWL

*Paving operations shall not be required to cease if the mean test value is equal to the LSL or USL and s = 0.

In cases where the Contractor is to cease paving operations based upon an Acceptance result or payfactor, the Contractor will submit a corrective action plan to the Department. The Department will only allow the continuation of paving operations when it is satisfied the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production.

401.201 Pay Adjustment - Method A & C The Department will use the following criteria for pay adjustment at the completion of the Lot using the pay adjustment factors under Section 106.7 - Quality Level Analysis.

Density Upon conclusion of each lot, density results shall be examined for statistical outliers as stated in Section 106.7.2. If the pay factor for Density falls below 0.80, all of the cores will be randomly re-cut by Sublot. A new pay factor will be calculated that combines all initial and retest results. If the resulting pay factor is below 0.80 , the entire Lot shall be removed and replaced with material meeting the specifications at no additional cost to the Department, except that the Department may, when it appears that there is a distinct pattern of defective material, isolate any defective material by investigating each mix sample sublot and require removal of defective mix sample sublots only, leaving any acceptable material in place if it is found to be free of defective material. Pay factors equal to or greater than the reject level will be paid accordingly.

Mix Properties The Department will determine a pay factor (PF) using the applicable Acceptance Limits. If all three pay factors for PGAB Content, VMA at N_{design}, and Voids at N_{design} fall below 0.80 for Method A, then the composite pay factor for PGAB Content, VMA at N_{design}, and Voids at N_{design} shall be 0.50.

The following variables will be used for pay adjustment:

PA = Pay Adjustment
Q = Quantity represented by PF in ton
P = Contract price per ton
PF = Pay Factor

The Department will determine a pay adjustment using Table 12: Pay Adjustment Calculations as follows:

TABLE 12: PAY ADJUSTMENT CALCULATIONS – METHOD A & C

Acceptance Method	Mix Properties / Gradation	Density
Method A	PA = (Voids @ N_d PF - 1.0)(Q)(P)x0.20 + (VMA @ N_d -1.0)(Q)(P)x0.20 + (PGAB Content PF- 1.0)(Q)(P)x0.10	PA = (density PF-1.0)(Q)(P)x0.50
Method C	PA = (% Passing Nom. Max PF-1.0)(Q)(P)x0.05+(% passing 2.36 mm PF-1.0)(Q)(P)x0.05+(%passing 0.30 mm PF-1.0)(Q)(P)x0.05+(%passing 0.075 mm PF-1.0)(Q)(P)x0.10+(PGAB Content PF-1.0)(Q)(P)x0.25	PA = (density PF-1.0)(Q)(P)x0.50

In addition, for 9.5 mm NMAS mixtures the following pay adjustment shall also apply:

The average percent passing for the 0.075 mm sieve shall be evaluated for each Lot. If the average is greater than 6.5%, a pay adjustment according to Table 13 below shall apply in addition to the other pay adjustments for the given method of testing.

TABLE 13: 0.075 MM SIEVE PAY ADJUSTMENT

Average Percent Passing 0.075 mm Sieve	Pay Adjustment
6.6% - 7.0%	-5%
> 7.0%	-10%

The Department shall notify the Contractor whenever the average of at least three samples in a given Lot is greater than 6.5%.

401.21 Acceptance Method B & D Unless otherwise stated in the 403 special provision, the Lot shall be the entire mix quantity per item per contract per year. The Department will sample once per sublot per pay item on a statistically random basis, test, and evaluate in accordance with the Acceptance Properties in Table 14. The Department will obtain samples of Hot Mix Asphalt Pavement in conformance with AASHTO R 97, Sampling Asphalt Mixtures, and the MaineDOT Policies and Procedures for HMA Sampling and Testing. The Contractor shall transport the samples in containers provided by the Department to the designated MaineDOT Laboratory within 48 hours except when otherwise noted in the project specific QCP or as directed by the Resident. Failure to deliver an acceptance sample to the designated acceptance laboratory will be considered the second incident under 106.4.6–QCP Non-Compliance. Target values shall be as specified in the JMF. The Department will withhold reporting of the test results for the Acceptance sample until 7:00 AM, on the second working day of receipt of the sample, or after receipt of the Contractors results of the Acceptance sample split.

TABLE 14: ACCEPTANCE PROPERTIES – METHOD B & D

Properties	**Point of Sampling**		**Test Method**
	Method B	**Method D**	
Gradation	Paver Hopper	Paver Hopper or Truck	AASHTO T 30
PGAB Content	Paver Hopper	Paver Hopper or Truck	AASHTO T 308
% TMD (In-Place Density)	Mat behind all Rollers	Mat behind all Rollers	AASHTO T 269
Voids at N_{design}	Paver Hopper	N/A	AASHTO T 312
VMA at N_{design}	Paver Hopper	N/A	AASHTO T 312
Fines to Effective Binder	Paver Hopper	N/A	AASHTO T 312
VFB	Paver Hopper	N/A	AASHTO T 312

TABLE 15: LOT AND SUBLOT SIZES – METHOD B & D

Lot Size*	Entire mix quantity per item per contract per year
Maximum Sublot Size – Mix	250 ton (Max 4 Sublots)
Sublot Size – Density	125 ton (Max 5 Sublots)

*General – Lot and Sublot size may be adjusted to accommodate the work scope and schedule, or as otherwise agreed upon at the Prepave Meeting

If there is less than one-half of a sublot remaining at the end of production for the year, then it shall be combined with the previous sublot. If there is more than one-half sublot remaining at the end of production for the year, then it shall constitute the last sublot.

TABLE 16: ACCEPTANCE LIMITS – METHOD B & D

Property	USL and LSL	
	Method B	**Method D**
Percent Passing 4.75 mm and larger	Target +/- 7%	Target +/- 7%
Percent Passing 2.36 mm sieve	Target +/- 5%	Target +/- 7%
Percent Passing 1.18 mm sieve	Target +/- 5%	Target +/- 5%
Percent Passing 0.60 mm sieve	Target +/- 4%	Target +/- 4%
Percent Passing 0.30 mm sieve	Target +/- 3%	Target +/- 3%
Percent Passing 0.075 mm sieve	Target +/- 3%	Target +/- 3%
PGAB Content	Target +/- 0.5%	Target +/- 0.5%
Voids at N_{design}	4.0% +/- 2.0%	N/A
Fines to Effective Binder	0.9 +/- 0.3	N/A
VMA at N_{design}	LSL from Table 1	N/A
VFB	Table 1 plus a 4% production tolerance for USL	N/A
% TMD (In-place Density)	94.5% +/- 2.5%	LSL of 92.0%

The Contractor shall cease paving operations whenever two consecutive Method B or D tests fall outside specification limits on the same property. The Contractor will submit a corrective action plan to the Department. The Department will only allow the continuation of paving operations when it is satisfied the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production.

401.211 Pay Adjustment - Method B & D For items accepted under Method B or D, if the mix is within the tolerances listed in Table 16, the Department will pay the contract unit price. Otherwise, pay adjustments as shown in Table 17 shall be applied to the quantity of mix represented by the test. The Contractor shall cut one 6 in core per sublot unless otherwise noted in Section 403 - Hot Mix Asphalt Pavement. If the density result is not within the specified limits the disincentive shall apply. If the sublot density is less than 88.5 percent or greater than 99.0 percent of the sublot TMD, two additional cores shall be cut at random locations determined by the Department. If either of the additional cores has a density less than 88.5 percent or greater than 99.0 percent of the sublot TMD, the sublot shall be removed and replaced at no cost to the Department; otherwise, the average of the three cores will be used to determine the sublot pay adjustment.

TABLE 17: PAY ADJUSTMENTS – METHOD B & D

Property	Method B		Method D	
Percent Passing 2.36 mm sieve	N/A		-2.0%	
Percent Passing 0.30 mm sieve	N/A		-1.0%	
Percent Passing 0.075 mm sieve	-2.0%		-2.0%	
PGAB Content	-5.0%		-5.0%	
Voids at N_{design}	-3.0%		N/A	
% TMD (In-place Density)	91.5% - 91.9% or 97.1% - 97.5%	-5.0%	91.5% - 91.9%	-5.0%
	90.5% - 91.4% or 97.6% - 98.5%	-10.0%	90.5% - 91.4%	-10.0%
	89.5% - 90.4% or 98.6% - 99.0%	-20.0%	89.5% - 90.4%	-20.0%
	88.5% - 89.4%	-30.0%	88.5% - 89.4%	-30.0%
	<88.5% or >99.0%	Reject	<88.5% or >99.0%	Reject

401.30 Method of Measurement The Department will measure Hot Mix Asphalt Pavement by the ton in accordance with Section 108.1 - Measurement of Quantities for Payment.

401.40 Basis of Payment The Department will pay for the work, in place and accepted, in accordance with the applicable sections of this Section, for each type of HMA specified.

The Department will pay for the work specified in Section 401.12, for the HMA used, except that cleaning objectionable material from the pavement and furnishing and applying bituminous material to joints and contact surfaces is incidental.-Payment for this work under the appropriate pay items shall be full compensation for all labor, equipment, materials, and incidentals necessary to meet all related contract requirements, including design of the JMF, implementation of the QCP, obtaining core samples, transporting cores and samples, filling core holes, applying emulsified asphalt to joints, and providing testing facilities and equipment. The Department will make a pay adjustment for quality as specified in Section 401.20 Acceptance Method A & B or 401.21 Acceptance Method C & D.

401.50 Process for Dispute Resolution At the time of Hot-Mix Asphalt sampling, the Department will obtain a split sample of each Acceptance test random sample for possible dispute resolution testing. The Contractor shall also obtain a split sample of the HMA at this same time. If the Contractor wishes to retain the option of requesting dispute testing of the initial Acceptance sample, the Contractor will test their split of the Acceptance sample in accordance with applicable AASHTO procedure and accepted supplemental practice as described in the Department's HMA Sampling and Testing Policies and Procedures manual. The Contractor shall report their results to the Resident, with a copy to Contractor.mainedot@maine.gov by 7:00 AM, on the second working day from time of QA sampling, otherwise dispute resolution will not be initiated. The Department's dispute resolution split sample will be properly labeled and stored for a period of at least two weeks after it has been reported, or until the sample is tested. The properties eligible for dispute and the respective variances are shown in Table 18.

The Contractor may dispute the Department's Acceptance results and request that the dispute resolution split sample be tested by notifying the Department's Resident and QA Engineer in writing within two working days after the results of the Acceptance test are reported. The following shall be provided in the request:

- Acceptance sample reference number
- The specific test result(s) or property(ies) being disputed, and
- The complete, signed report of the Contractor's testing (In a lab certified by the NETTCP and MaineDOT) of their split of the Acceptance sample indicating that the variances in Table 18 for the specific test result(s) or property(ies) were met or exceeded.

TABLE 18: DISPUTE RESOLUTION VARIANCE LIMITS

Property	Method A & B	Method C & D*	Variance Limits
PGAB Content	Yes	Yes	+/- 0.4%
G_{mb}	Yes	No	+/- 0.030
G_{mm}	Yes	Only if referenced to a Core	+/- 0.020
Voids at N_{design}	Only if G_{mb} or G_{mm} is not disputable	No	+/- 0.8%
VMA at N_{design}	Only if G_{mb} or G_{mm} is not disputable	No	+/- 0.8%
Percent Passing 4.75 mm and larger sieves	No	Yes^	+/- 4.0%
Percent Passing 2.36 mm to 0.60 mm sieves	No	Yes^	+/- 3.0%
Percent Passing 0.30 mm to 0.15 mm sieves	No	Yes^	+/- 2.0 %
0.075 mm sieve	Only for 9.5 mm NMAS mixes	Yes	+/- 0.8%

*Disputes will not be allowed on Item 403.209

^Disputes will only be allowed on Sieve Sizes used for pay adjustment calculations

The value of any disputed result or property reported for the initial Acceptance sample shall stand if the value reported for the dispute resolution sample is not closer to the value the Contractor reported for their split sample than to the value reported for the initial Acceptance sample. If the value reported for the dispute resolution falls precisely half-way between the other two values the value reported for the dispute resolution will replace the original acceptance value. Otherwise, the value reported for the dispute resolution sample will replace the value reported for the initial Acceptance sample and will be used to re-calculate any other affected results or properties.

SECTION 402 - PAVEMENT SMOOTHNESS

402.00 Smoothness Projects Projects to have their pavement smoothness analyzed in accordance with this Specification will be so noted in Special Provision 403 - Hot Mix Asphalt Pavement.

402.01 Pavement Smoothness The final pavement surface shall be evaluated for smoothness using a Class I or Class II profiler as defined by ASTM E950 (94). Smoothness measurements will be expressed in terms of the International Roughness Index (IRI) as defined by the World Bank, in units of inches/mile.

402.02 Lot Size Lot size for smoothness will be 3000 lane-feet. A sublot will consist of 50 lane-feet. Partial lots will be included in the previous lot if less than one-half the size of a normal lot. If equal to or greater than one-half the normal lot size, it will be tested as a separate lot.

402.03 Acceptance Testing The Department will conduct Acceptance testing following completion of the surface course. Sections to be excluded from testing include the following:

- Bridge decks and joints (no smoothness measurements will be taken within 100 ft of bridge joints)
- Acceleration and deceleration lanes
- Shoulders and ramps
- Side streets and roads
- Within 100 ft of transverse joints at the beginning and end of the project
- Within 100 ft of railroad crossings
- Urban areas with speed limits of 30 mph or lower

Each lot shall have 2 measurements made in each wheel path. The average of the 4 measurements will determine the smoothness for that lot. The smoothness measurements will be statistically evaluated for pay factors as described in Subsection 106.7 - Quality Level Analysis, using the specification limits shown below.

TABLE 1: ACCEPTANCE LIMITS

Level	USL
I	55 in/mile
II	65 in/mile
III	75 in/mile

Computation of Smoothness Pay Adjustment:

PA = (PF-1.0)(Q)(P) where:
Q = Quantity of surface course in the Lot (excluding shoulders, side streets, bridge decks, ramps, acceleration and deceleration lanes)
PF = smoothness pay factor for the Lot
P = Contract unit price for surface pavement
PA = pay adjustment

402.04 Unacceptable Work In the event that any Lot is found to have a pay factor less than 0.80, the Contractor shall take whatever remedial action is required to correct the pavement surface in that Lot at no additional expense to the Department. Such remedial action may include but is not limited to removal and replacement of the unacceptable pavement. In the event remedial action is necessary, the Contractor shall submit a written plan to the Resident outlining the scope of the remedial work. The Resident must approve this plan before the remedial work can begin. Following remedial work, the Lot shall be retested, and will be subject to the specification limits listed above. The resulting pay factor, if within the acceptable range, will be used in the final pay adjustment. The Contractor shall pay the cost of retesting the pavement following corrective action.

Localized surface tolerance defects will be subject to the provisions outlined in Section 401.11 Surface Tolerances.

Payment will be made under:

Pay Item	Pay Unit
402.10 Incentive/Disincentive - Pavement Smoothness	Lump Sum

SECTION 403 - HOT MIX ASPHALT PAVEMENT

403.01 Description This work shall consist of constructing one or more courses of Hot Mix Asphalt pavement on an approved base in accordance with these specifications, and in reasonably close conformity with the lines, grades, thickness and typical cross sections shown on the plans or established. The HMA pavement shall be composed of a mixture of aggregate, filler if required, and asphalt material.

403.02 General The materials and their use shall conform to the requirements of Section 401 - Hot Mix Asphalt Pavement.

403.03 Construction The construction requirements shall be as specified in Section 401 - Hot Mix Asphalt Pavement.

403.04 Method of Measurement Hot mix asphalt pavement will be measured as specified in Section 401.21- Method of Measurement.

403.05 Basis of Payment The accepted quantities of hot mix asphalt pavement will be paid for at the contract unit price per ton for the mixtures, including hot mix asphalt material complete in place. Method A, Method B, Method C and Method D shall be used for acceptance as specified in Section 401 - Hot Mix Asphalt Pavements. (See Complementary Notes, Section 403 - Hot Mix Asphalt Pavement, for Method location).

Payment will be made under:

Pay Item		Pay Unit
403.102	Hot Mix Asphalt Pavement for Special Areas	Ton
403.206	Hot Mix Asphalt, 25 mm Nominal Maximum Size	Ton
403.207	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size	Ton
403.2071	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size (Polymer Modified)	Ton
403.2072	Asphalt Rich Hot Mix Asphalt, 19.0 mm Nominal Maximum Size (Asphalt Rich Base and Intermediate course)	Ton
403.208	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size	Ton
403.2081	Hot Mix Asphalt - 12.5 mm Nominal Maximum Size (Polymer Modified)	Ton
403.209	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Sidewalks, Drives, Islands & Incidentals)	Ton
403.210	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size	Ton
403.2101	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Polymer Modified)	Ton
403.2104	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Thin Lift Surface Treatment)	Ton
403.211	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Shimming)	Ton
403.2111	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Shimming, Polymer Modified))	Ton
403.212	Hot Mix Asphalt, 4.75 mm Nominal Maximum Size	Ton
403.213	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course)	Ton
403.2131	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course, Polymer Modified)	Ton
403.2132	Asphalt Rich Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course)	Ton
403.214	Hot Mix Asphalt, 4.75 Nominal Maximum Size (5/8” Surface Treatment)	Ton

SPECIAL PROVISION
SECTION 401
SECTION 401 - HOT MIX ASPHALT PAVEMENT
(HMA Hamburg Wheel Tracker Specification)

401.03 Composition of Mixtures The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. HMA shall be designed and tested according to AASHTO R35 and the volumetric criteria in Table 1. The Contractor shall size, uniformly grade, and combine the aggregate fractions in proportions that provide a mixture meeting the grading requirements of the Job Mix Formula (JMF). Unless otherwise noted in Special Provision 403 - Hot Mix Asphalt Pavement, the design, verification, Quality Control, and Acceptance tests for this mix will be performed at 65 gyrations.

TABLE 1: VOLUMETRIC DESIGN CRITERIA

Design ESAL's (Millions)	Required Density (Percent of G_{mm})			Voids in the Mineral Aggregate (VMA)(Minimum Percent) Nominal Maximum Aggregate Size (mm)					Voids Filled with Binder (VFB) (Minimum %)	Fines/Eff. Binder Ratio
	$N_{initial}$	N_{design}	N_{max}	25	19	12.5	9.5	4.75		
<3	≤90.5	96.0	≤98.0	13.0	14.0	15.0	16.0	16.0	65-80*	0.6-1.2
3 to <10	≤89.0									
≥ 10										

*For 9.5 mm nominal maximum aggregate size mixtures, the maximum VFB is 82.
*For 4.75 mm nominal maximum aggregate size mixtures, the maximum VFB is 84.

The Contractor shall submit for Department approval a JMF to the Pavement Materials Engineer for each mixture to be supplied including the PG binder grade/supplier and the intended test temperature for the HWT approval. The JMF will be approved by the Department in accordance with the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual. If the Contractor is submitting a new JMF, the Contractor shall identify and make available the stockpiles of all proposed aggregates at the plant site at the time of JMF submittal. There must be a minimum of 150 ton for coarse aggregate stockpiles and 75 ton for fine aggregate stockpiles before the JMF may be submitted. The Contractor shall provide aggregate samples to the Department unless otherwise required. The Contractor shall also make available to the Department the PG Binder proposed for use in the mix in sufficient quantity to test the properties of the asphalt and to produce samples for testing of the mixture. If the Contractor is submitting a new JMF the first day's production shall be monitored, and approval may be withdrawn if the mixture exhibits undesirable characteristics such as checking, shoving or displacement. The Contractor shall be allowed to submit aim changes for a JMF as outlined in the MaineDOT HMA Policies and Procedures for HMA Sampling and Testing Manual: Mix Design Approval Section.

The Contractor shall submit a new JMF for approval each time a change in material source or materials properties is proposed. The same approval process shall be followed. The cold feed percentage of any aggregate may be adjusted up to 10 percentage points from the amount listed on the JMF, however no aggregate listed on the JMF shall be eliminated. The cold feed percentage for RAP may be reduced up to 10 percentage points from the amount listed on the JMF and shall not exceed the percentage of RAP approved in the JMF or for the specific application under any circumstances.

If submitting a new JMF, the Contractor shall provide the Department with eight boxes of plant produced HMA before the start of paving. The Contractor shall test its split of the sample and determine if the results meet the requirements of the Department's written policy for mix design verification (See MaineDOT Policies and Procedures for HMA Sampling and Testing). If the results are found to be acceptable, the Contractor will forward their results to the Department's Lab, which will test the Department's split of the sample. The results of the two split samples will be compared and shared between the Department and the Contractor. If the HMA meets the requirements for mix design verification, the mixture will be tested for rutting and moisture sensitivity in the Hamburg Wheel Tracker according to AASHTO T324, "Hamburg Wheel-Track Testing of Hot Mix Asphalt (HMA)." The Department will not test the mixture for HWT until the HMA meets the mix design verification requirements.

The sample will be required to meet the applicable requirements of Table 1A below for approval and will be dependent on the test temperature submitted by the Contractor. The minimum PG Binder grade required shall be as specified by the 403 Special Provision. The Contractor may submit a design with a binder grade exceeding the minimum specified to meet the HWT requirements of the 403. If the sample meets the requirements of Table 1A, an approved JMF listing the approved PG Binder Grade to meet the HWT requirements will be forwarded to the Contractor and paving may commence. The Department will have five business days from receipt of the sample at the Central Laboratory to process, test, and report the Hamburg Wheel Tracker sample. The first day's production shall be monitored, and the approval may be withdrawn if the mixture exhibits undesirable characteristics such as checking, shoving or displacement.

TABLE 1A: HAMBURG WHEEL TRACKER REQUIREMENTS

Specified PG Binder Grade	Test Temperature (°C)	Maximum Rut Depth (mm)	Minimum Number of Passes	Minimum Allowable SIP*
PG 64-28	45	12.5	20,000	15,000
PG 64E-28	48	12.5	20,000	15,000
PG 70E-28 (or greater)	50	12.5	20,000	15,000

* As calculated by the most recently published version of the MaineDOT HWT worksheet, which is available online at https://www.maine.gov/dot/doing-business/hma-resources

Should the Contractor choose to change their PG Binder source and/or modify the PG Binder grade after initial approval, the Department will take an additional verification sample and test the HMA to verify compliance with the Hamburg Wheel Tracker Requirements. If this sample fails to meet the criteria in Table 1A, the Contractor will be required cease production and submit a corrective action letter to the Department. HWT approval of the JMF will be suspended until the Department can verify that the submitted sample meets the requirements of Table 1A. Failure to notify the Department of a change in supplier will be treated as a second incident under 106.4.6 QCP Non-compliance.

401.19 Contractor Quality Control - Method A, B, C & D The following language has been added to Section 401.19:

The project specific QCP shall address the PG Binder source and grade, sampling, transport, and testing of Hamburg Wheel Tracker QC samples and what potential steps will be taken if QC samples do not meet the requirements in Table 1A. The project-specific QCP shall also contain a sample Hamburg Wheel Tracker test report for approval. The Contractor shall sample and test HMA Pavement in the Hamburg Wheel Tracker according to AASHTO T324 in accordance with the following minimum frequencies:

TABLE 2A: MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Hamburg Wheel Tracker	1 per 6,000 ton and at least once per Acceptance Lot	AASHTO T 324

If the Contractor is submitting a new JMF the Contractor shall sample the HMA on the first day of production and test the sample in the Hamburg Wheel Tracker according to AASHTO T324. This sample will not count towards the minimum quality control frequency specified in Table 2A.

The Contractor shall submit all Hamburg Wheel Tracker test reports in writing, signed by the appropriate technician and present them to the Department within ten working days of initial sampling, except when otherwise noted in the project specific QCP due to local restrictions. The Contractor shall make the raw Hamburg Wheel Tracker data from QC samples available to the Department upon request. If a QC sample fails to meet the criteria in Table 1A, the Contractor will be required to submit a corrective action letter to the Resident, Materials Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the following working day with the proposed changes to bring the mixture back into compliance. The Department will respond and either accept or reject the Contractor's proposed corrective action by the end of the following working day from when the letter was received.

401.20 & 401.21 Acceptance Method(s) A, B, C & D The following language has been added to Section(s) 401.20 & 401.21

First Day Production HWT Verification Sample for Acceptance The Department will sample the HMA on the first day of production. This sample will be considered a first day of production HWT verification sample and will not count towards the minimum HWT acceptance frequencies specified in Table 3A unless otherwise determined by the Department. This sample may be taken in conjunction with the first mix acceptance sample. The number of boxes required will be as specified in Table 3B.

If the first day of production HWT verification sample fails to meet the criteria in Table 1A or yields two consecutive inconclusive results, the Contractor shall cease paving operations and submit a verification sample to the Department. HWT approval of the JMF will be suspended until the Department can verify that the submitted sample meets the requirements of Table 1 and Table 1A.

A first day production sample will not be required for a previously approved JMF that has met HWT requirements listed in Table 1A if the following criteria have been met:

1. A minimum of one passing HWT Department issued acceptance results within the calendar year (Construction Season) of production.
2. A minimum of three consecutive passing HWT Department issued acceptance results within the past year of production (365 days). These results shall be the three most recent Department issued acceptance samples.
3. No changes in the source of the PG Binder and/or modifications to the PG Binder grade from the initial HWT approval have been made.

As part of the QCP, the Contractor shall provide in writing the request to waive the first day production sample and will include the necessary supporting documentation as specified above.

Acceptance Sampling The Department will sample at the HWT acceptance frequencies specified in Table 3A to verify the compliance with the Hamburg Wheel Tracker Requirements. The number of boxes required will be as specified in Table 3B, with two boxes reserved for retesting of inconclusive results. A mix acceptance sample within an acceptance lot will be selected at random by the Department for HWT acceptance sampling. Depending on daily production rates, the first day of production HWT verification sample and the first acceptance sample may be taken on the same day, but shall not be from the same acceptance sample unless otherwise determined by the Department.

If a HWT acceptance sample fails to meet the criteria in Table 1A and fails to exceed an average of 15,000 cycles, the Contractor shall cease paving operations and submit a verification sample to the Department. HWT approval of the JMF will be suspended until the Department can verify that the submitted sample meets the requirements of Table 1 and Table 1A. A pay factor will be determined using Table 4.

If a HWT acceptance sample fails to meet the criteria in Table 1A, but exceeds an average of 15,000 cycles, the Contractor shall cease paving operations and submit a Corrective Action to the Department. A pay factor for the failing sample will be determined using Table 4.

Inconclusive Results If a HWT acceptance sample indicates an “inconclusive result” the Department will immediately retest the sample using the additional retained 2 boxes. Should the second sample also yield an inconclusive result, the Contractor shall cease paving operations and submit a verification sample to the Department. HWT approval of the JMF will be suspended until the Department can verify that the submitted sample meets the requirements of Table 1 and Table 1A.

Informational Sampling At the Resident’s discretion, the Department may take additional informational samples and test the HMA to verify compliance with the Hamburg Wheel Tracker Requirements. If an informational sample fails to meet the criteria in Table 1 or Table 1A, the Contractor will be required to submit a corrective action letter to the Department.

TABLE 3A: MINIMUM HWT ACCEPTANCE FREQUENCIES

Test or Action	Frequency
Hamburg Wheel Tracker	1 per 6,000 ton or at least once per Acceptance Lot

TABLE 3B: MINIMUM NUMBER OF BOXES

Sample Type	Number of Boxes
First Day Production (Taken without Mix Acceptance)	8 (4 Additional)
First Day Production (Take w/ Mix Acceptance)	8 (4 Additional)
HWT Acceptance Sample	8 (4 Additional)

Cease For ALL occurrences of cease described in the sections above, the Contractor shall submit a corrective action letter to the Resident, Materials Engineer, Pavement Quality Manager, and Pavement Quality Engineer by the end of the following work day with the proposed changes to bring the mixture back into compliance. Failure to do so will be treated as a second incident under 106.4.6 QCP Non-compliance. The Department will only allow the continuation of paving operations when it is satisfied that the corrective action will result in an improvement in results. The Department may require the submittal of a passing verification sample to allow further production.

401.201 & 401.211 Pay Adjustments Method(s) A, B, C & D The following language has been added to Section(s) 401.201 & 401.211

For items accepted under Method(s) A, B, C &D, if the mix is within the tolerances listed in Table 1A, the Department will pay the contract unit price, otherwise pay adjustments as shown in Table 4 shall be applied to the quantity of mix represented by the test. The average passes to failure will be used to determine the number of passes.

TABLE 4: HWT PAY ADJUSTMENT

Number of Passes	Pay Adjustment
< 20,000	-1.0% for every 1000 passes below target

SPECIAL PROVISION
SECTION 401 - HOT MIX ASPHALT PAVEMENT
(HMA with Fine Micro-Deval Requirement)

The following subsections of the most current version of Specification 401 – Hot Mix Asphalt Pavements have been revised and amended by the following:

401.01 Description The Contractor shall compose Hot Mix Asphalt (HMA) Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. If denoted in Special Provision 403 - Hot Mix Asphalt Pavement, the mixtures shall meet the additional aggregate requirements of this special provision.

401.02 Materials Materials shall meet the requirements specified in Section 700 – Materials, unless otherwise revised in this special provision:

Aggregates for HMA Pavement	703.07
HMA Mixture Composition	703.09

The HMA blend, minus any RAP used, shall have a Fine Micro-Deval value of 15.0 or less as determined by weighted average of individual fine aggregate source values determined through ASTM D7428.

SPECIAL PROVISION
SECTION 403
HOT MIX ASPHALT

Desc. Of Course	Grad Design.	Item Number	Total Thick	No. Of Layers	Comp. Notes
Sherwood Street - 4" HMA					
Travelway, Turn Lanes, and Shoulders (As Indicated)					
Wearing	12.5 mm	403.2081	1 ½"	1	2,4,8,12,24,42,53
Base	12.5 mm	403.2131	2 ½"	1	2,4,8,12,24,41,42,53
I-295 Off Ramp - 8" HMA					
Travelway & Shoulders (As Indicated)					
Wearing	12.5 mm	403.2081	1 ½"	1	6,4,8,12,22,23,24,40,42,53,55
Intermediate	12.5 mm	403.2081	1 ½"	1	6,4,8,12,22,23,24,40,42,53,55
Base	12.5 mm	403.2131	2"	1	2,4,8,12,24,41,42,53
Base	12.5 mm	403.2131	3"	1	2,4,8,12,24,41,42,53
Multimodal Coastal Path - 4" HMA					
Travelway and Shoulders (As Indicated)					
Wearing	12.5 mm	403.208	1 ½"	1	4,8,12,24,42,53
Base	12.5 mm	403.213	2 ½"	1	4,8,12,24,41,42,53
Veranda Street - Variable Depth Mill & 1 ½" HMA Overlay w/ HMA Shim					
Travelway, Turn Lanes, and Shoulders (As Indicated)					
Wearing	12.5 mm	403.2081	1 ½"	1	2,4,8,12,24,42
Shim	9.5 mm	403.211	variable	1/more	4,8,12,20,30,41
4" HMA - Veranda Street					
Raised Intersections (As Indicated or Directed)					
Wearing	12.5 mm	403.2081	1 ½"	1	2,4,8,12,24,30,31
Shim	9.5 mm	403.211	variable	1/more	4,8,12,20,24,30,31
Veranda Street					
Utility & Drainage Trench Base Paving (As Indicated or Directed)					
Base	12.5 mm	403.213	4"	2/more	4,8,12,24,30,34
Veranda Street					
Catch Basin, Curb Installation Areas, & ADA Upgrade Base Paving (As Indicated or Directed)					
Base	12.5 mm	403.213	3"	2/more	4,8,12,24,30,35,53
Spot Shims (As Directed)					
Shim	9.5 mm	403.211	variable	1/more	4,8,12,20,24,30
Granite Cobble with Bituminous Base - 2" HMA (As Indicated)					
Wearing	9.5 mm	403.209	2"	1/more	3,12,20,24,30,32,53
3" HMA - Sidewalks (As Indicated)					
Wearing	9.5 mm	403.209	3"	2/more	3,12,20,30,32
Drives, Islands & Misc. (As Directed)					
Wearing	9.5 mm	403.209	2"-3"	1/more	3,12,20,30,32

COMPLEMENTARY NOTES

2. The required PGAB shall be a storage-stable, homogeneous, polymer modified asphalt binder that meets **PG 70E-28** grading requirements in AASHTO M 332. All polymer modified asphalt grades utilized on the Project shall be treated with an approved liquid anti-strip. PG binders shall be treated either at the asphalt source terminal with the required dose rate on the delivery documentation, or at the hot mix asphalt plant utilizing a system integrated with the plants controls that will introduce a minimum 0.50 percent anti-strip by weight of asphalt binder used unless a rate is otherwise recommended by the anti-strip manufacturer. The PGAB and anti-strip blend shall meet the **PG 64E-28** requirements. The Contractor shall provide supporting test data showing the PGAB and anti-strip blend meet the required criteria.
3. The aggregate qualities shall meet the design traffic level of <3 million ESALS for mix placed under this contract. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
4. The aggregate qualities shall meet the design traffic level of 3 to <10 million ESALS for mix placed under this contract. The design, verification, Quality Control, and Acceptance tests for this mix will be performed at **65 gyrations**.
6. The required PGAB shall be a storage-stable, homogeneous, polymer modified asphalt binder that meets or exceeds **PG 70E-28** grading requirements in AASHTO M 332. All polymer modified asphalt grades utilized on the Project shall be treated with an approved liquid anti-strip. PG binders shall be treated either at the asphalt source terminal with the required dose rate on the delivery documentation, or at the hot mix asphalt plant utilizing a system integrated with the plants controls that will introduce a minimum 0.50 percent anti-strip by weight of asphalt binder used unless a rate is otherwise recommended by the anti-strip manufacturer. The PGAB and anti-strip blend shall meet or exceed the **PG 70E-28** requirements. The Contractor shall provide supporting test data showing the PGAB and anti-strip blend meet the required criteria.
8. Section 106.6 Acceptance, (2) **Method B** as specified Section 401.21 - Quality Assurance Methods B and D. As a minimum, one sample and one core (if required) will be taken per mix pay item per project phase.
12. A Pre-Pave Meeting **is required** prior to the commencement of work paid under this item.
20. The combined aggregate gradation required for this item shall be classified as a 9.5mm Thin Lift Mixture (TLM) mixture, using the Aggregate Gradation Control Points as defined in 703.09.
22. A notch wedge apparatus meeting the requirements of section 401.16 shall be required on all joints between traveled lanes. Longitudinal Joint Density incentive/disincentives will not apply, however the Department may require cores for informational purposes. In place of using a notch wedge apparatus, the Contractor may seal the vertical surface of the longitudinal joints with hot-applied rubberized asphalt material, meeting the requirements of Type 4 or mastic crack seal. Sealant shall be applied to form a complete seal between each of the faces of the HMA and shall extend up the vertical surface to within ½ inch of the top of the HMA layers. This work shall be considered incidental to the contract pavement items.
23. The mixture shall meet the minimum requirements of Special Provision 401 – HMA Hamburg Wheel Tracker Specification. The Department shall collect 4 additional boxes of HMA on the first day of production and may collect additional material as deemed appropriate.
24. See Special Provision 401 - HMA with Fine Micro-Deval Requirement for project specifics.

30. The incentive/disincentive provisions for density shall not apply. Rollers shall meet the requirements of this special provision. The use of an oscillating steel roller shall be required to compact all mixtures pavements placed on bridge decks.
31. For Raised Intersections, the compaction of the new Hot Mix Asphalt Pavement will be obtained using a minimal roller train consisting of a **10 ton** vibratory,**10 ton** oscillatory roller**,** and a **3-5 Ton** finish roller for roadway work. A **Quality Control Technician (QCT)** shall be required for all roadway mixtures placed under this contract. A daily paving report, summarizing the mixture type, mixture temperature, equipment used, environmental conditions, and number of roller passes, shall be recorded and signed by the QCT and presented to the Department's representative by the **end of the working day**.
32. In areas inaccessible to a **10 ton** roller, compaction of the new Hot Mix Asphalt Pavement will be obtained using a minimal roller train consisting of a **3-5 ton** vibratory roller. Areas less than 2 feet wide shall be compacted with a minimum of a **150 pound** plate compactor. An approved release agent is required to ensure the mixture does not adhere to hand tools, rollers, pavers, and truck bodies. The use of petroleum based fuel oils, or asphalt stripping solvents will not be permitted.
34. The Contractor shall saw cut at a consistent width to allow transverse rolling of the trench. When applicable, a **10 ton** roller will be required. In areas inaccessible to a **10 ton** roller, compaction of the new Hot Mix Asphalt Pavement will be obtained using a minimal roller train consisting of a **3-5 ton** vibratory roller. The **minimum width of the trench shall be 5 feet** to accommodate a **3-5 ton** vibratory roller. An approved release agent is required to ensure the mixture does not adhere to hand tools, rollers, pavers, and truck bodies. The use of petroleum based fuel oils, or asphalt stripping solvents will not be permitted. Payment for additional milling or saw cutting required shall not be considered directly, but instead shall be considered incidental to the paving items.
35. The Contractor shall saw cut at a consistent width to allow compaction of mix in the trench. The minimum width of the trench shall be **2 feet** to accommodate a **150 lbs** vibratory tamper as a minimum. Payment for additional milling or saw cutting required shall not be considered directly, but instead shall be considered incidental to the paving items.
40. The entire roadway (from curb to curb, including bike lanes) shall be considered mainline travelway for density testing purposes according to the specified testing method.
41. The lower lifts of HMA pavement (consisting of 5 inches of Base in the 8 inch sections, 2½ inches of Base in the 4 inch sections, and the Shim layer on the Mill and Fill sections) shall be completed before use by project construction equipment as a haul route, and in any section is opened to public vehicular traffic. Any HMA placed after the seasonal limitations shall be considered temporary and removed and replaced the following construction season. The Department will not be responsible for costs or time related to the placement, removal or replacement of temporary pavement.
42. The Contractor shall plan its construction sequencing so that no longitudinal joints fall within the mainline travelway lanes (excluding center turn lanes)
53. At the discretion of the Contractor, the use of concrete fill will be allowed in lieu of pavement and gravel to back fill around granite curbing (Type 1 & 5). When utilized, at least 3" of HMA shall be placed on top of the concrete fill for cover on the mainline edge of curb (face of curb). At minimum, the Concrete shall be a 3000 psi Class S or Class Fill Concrete. **Flowable fill shall not be permitted**. Unless otherwise specified, there will not be additional compensation for the Concrete Fill but shall be considered incidental to the 609 items.

55. The vertical surface of the longitudinal joint between the edge of the concrete truck apron and proposed HMA shall be completely sealed with hot-applied rubberized asphalt material, meeting the requirements of Type 4 or mastic crack seal. Sealant shall be applied to form a complete seal between the concrete and HMA and shall extend up the vertical surface to within ½ inch of the top of the HMA surface layer (7.5 inches). This work shall be considered incidental to the contract pavement items.

Tack Coat

A tack coat of emulsified asphalt, RS-1, RS-1h, CRS-1 or CRS-1h, Item 409.15 shall be applied to any existing pavement at a rate of approximately 0.030 gal/yd², and on milled pavement approximately 0.050 gal/yd² prior to placing a new course. A fog coat of emulsified asphalt shall be applied between shim /base courses and surface course as well as to any bridge membrane prior to the placement of HMA layers at a rate not to exceed 0.030 gal/yd². Tack used will be **paid for at the contract unit price** for Item 409.15 Bituminous Tack Coat.

SPECIAL PROVISION
SECTION 412
STABILIZED AGGREGATE SURFACE
(Decomposed Granite Surface with Stabilizer)

The provisions of the 2020 Standard Specifications with the following additions shall apply:

412.01 Description

This work shall consist of furnishing and constructing stabilized decomposed granite surface with dense graded stone base, including filter fabric, as indicated on the Drawings and as specified.

412.021 Crushed Stone Base Course

Aggregate shall conform to MaineDOT Supplemental Specification 703.06(a), Aggregate for base, Type B.

412.022 Decomposed Granite

Surfacing material shall be sand and crushed stone consisting of inert materials that are hard and durable, with stone free from surface coatings and deleterious materials. Gradation requirements shall be as follows:

Sieve Size	% Passing by Weight
½ inch	95 – 100
3/8 inch	90 – 100
No. 4	65 – 80
No. 8	48 – 63
No. 16	40 – 49
No. 30	30 – 40
No. 50	20 – 27
No. 100	10 – 18
No.200	10 – 12

Crushed stone color shall be “cool gray” as approved by the Resident.

412.023 Stabilizer

Stabilizer additive shall be "Stabilizer”, a non-toxic, colorless, odorless, concentrated powder organic binder capable of binding crushed aggregate screenings, manufactured by Stabilizer Solutions, Inc., or approved equal.

Stabilizer Solutions, Inc.
33 South 28th Street, Phoenix, AZ 85034.
Telelephone: (602) 225-5900; 1-800-336-2468; Fax: (602) 225-5902.
E-mail: info@stabilizersolutions.com

412.024 Filter Fabric

Filter fabric shall be a non-woven stabilization/reinforcement geotextile that conforms to MaineDOT Standard Specifications, Section 620 Geotextiles.

412.025 Mock-Up

Unless authorized otherwise, the Contractor shall provide for acceptance, a 5' x 5' mock-up of the stabilized decomposed granite surface, no less than 30 days prior to constructing the stone dust surfaces represented by the mock-up. The mock-up panels shall be located in a non-public area accepted by the Resident and shall be protected from damage until the completion and acceptance of the work represented by the mock-up.

Additional mock-ups shall be constructed until an acceptable mock-up is produced. The accepted mock-up shall be the standard for color, texture, mix ratio and workmanship for the work. Utilize the same source, stock, or brand of stabilizer material for all stone dust surfacing. Do not interchange materials or mixes until an additional mock-up shows that uniformity in finish texture and color, as compared to original mock-up will be maintained. If necessary, obtain and stockpile materials in sufficient quantity to ensure continuity and uniformity. Use the same stone dust/stabilizer mix and placement procedure accepted in the mock-ups in the final work, unless otherwise directed by the Resident.

Remove the mock-up panels from site at completion of the project as directed by the Resident.

412.04 Shaping, Compacting, and Stabilizing

Stabilizer shall be provided thoroughly and uniformly pre-blended with approved decomposed granite from local supplier, at rate, and by method in strict accordance with the manufacturer's printed instructions.

- Blend 12 to 16 pounds (contact manufacturer for exact blend) of Stabilizer per 1-ton of decomposed granite or crushed aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed aggregate screenings.
- Bucket blending is not acceptable. Blending with a rake and or shovel is not acceptable.
- Blend material dry.

Decomposed granite surface shall be installed only after adjacent excavation and construction work which might cause damage has been completed. Damage caused during construction shall be repaired at the Contractor's expense before acceptance.

Decomposed granite surface shall be constructed on a compacted aggregate base as indicated in the plans.

Pre-blended stabilized decomposed granite or crushed aggregate screenings shall be spread evenly over the base in 2-inch maximum lifts, rolled and compacted to 85% of maximum density as determined by ASTM D 1557. Final compacted thickness shall be 4 inches.

Water shall be added to decomposed granite for full-depth moisture penetration prior to compacting.

- A minimum of 25 to 45 gallons of water per 1-ton must be applied to achieve saturation of stabilized pathway profile.
- During water application randomly test for depth using a probing device, which reaches full depth.

Upon thorough moisture penetration, compact stabilized decomposed granite to 85% relative compaction with 2- to 4-ton drum roller or 1000 lb. single drum roller as required to achieve a dense, hard packed surface conforming to the finish grades indicated.

- The Contractor shall wait a minimum of 12 hours after placing stabilized decomposed granite material prior to compaction. Longer periods may be required for material to adequately dry. Consult the manufacturer for recommendations.
- Do not use vibratory rollers or compactors.
- The Contractor shall hand tamp areas adjacent to irrigation or plantings with 8-inch or 10-inch hand tamper.
- If surface aggregate dries significantly quicker than subsurface material, lightly mist surface before compaction operations.

Variations in smoothness of finished stone dust surface shall be less than or equal to ¼ inch when tested with a 10-foot straightedge, applied both parallel to and at right angles to centerline of stone dust surface areas. Irregularities exceeding these amounts or which retain water on the surface shall be corrected by removing defective work and replacing with new material conforming to this specification.

Crushed stone surface shall comply with ADA Requirements for slip resistance and accessibility, with a minimum static coefficient of friction of 0.6 for accessible routes and 0.8 for ramps, when tested in accordance with ASTM C1028.

Allow finished surfaces to dry completely before permitting use.

412.06 Method of Measurement

Decomposed Granite Surface with Stabilizer will be measured for payment complete and in place, by the square yard of finished surface.

412.07 Basis of Payment

The accepted quantity of Decomposed Granite Surface with Stabilizer will be paid for at the contract unit price per square yard, complete in place which price will be full compensation for furnishing all equipment, materials, and labor to blend, install, cure and compact decomposed granite in accordance with the plans and these specifications. Filter Fabric will be paid for under Section 620 Geotextiles. Base and subbase material will be paid for separately under the appropriate Aggregate Base Course item.

Payment will be made under:

Pay Item		Pay Unit
412.10	Decomposed Granite Surface with Stabilizer	Square Yard

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(QC/QA Acceptance Methods)

CLASS OF CONCRETE	ITEM NUMBER	DESCRIPTION	P	METHOD
Per Plans	502.21	Structural Conc. Abut. and Retaining Walls	N/A	C
A	502.341	Structural Concrete, Roadway Median	N/A	C
A	502.342	Structural Concrete, Roadway Truck Apron	N/A	C
A	608.07	Plain Concrete Sidewalk	N/A	C
A	608.08	Reinforced Concrete Sidewalk - Pedestrian	N/A	C
A	608.08	Reinforced Concrete Sidewalk - Vehicular	N/A	C
A	815.40	Cast-in-Place Concrete Seatwall	N/A	C
A	815.41	Terraced Landscape	N/A	C
A	890.07	Bike Rack	N/A	C

P values listed above reflect the price per cubic yard (CY) for all pay adjustment purposes.

The quantity used for Pay Adjustment purposes shall be the actual quantity of cast in place concrete placed and accepted. This quantity shall be computed by the Contractor and submitted to the Resident for approval.

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(Roadway Median and Roadway Truck Apron)

The provisions of Section 502 of the 2020 Standard Specifications with the following additions shall apply:

502.01 Description

This work shall consist of furnishing and placing a Portland Cement concrete pavement and incidental construction for raised concrete islands and truck aprons, as shown on the plans and as directed by the Resident. Except as otherwise specified in this Special Provision, all work shall be in conformity with the applicable provisions of Section 502, Structural Concrete; Section 503, Reinforcing Steel; and Section 515, Protective Coating for Concrete Surfaces.

502.03 Materials

Concrete for Roadway Medians and Roadway Truck Aprons shall be Class A.

Reinforcement shall be 6" x 6" – W1.4 x W1.4 Welded Steel Wire Fabric conforming to Section 503 and Section 709.02

502.10 Placing Concrete

The existing material shall be removed to the depth shown on the plans. The foundation bed shall be well graded and compacted, as directed by the Resident, and additional gravel shall be placed to provide the thickness of concrete indicated on the plans.

Prior to the concrete placement, the foundation bed shall be thoroughly and uniformly saturated with water. The bed shall be free of puddles and excessive surface water.

Concrete shall be placed in a continuous placement operation between preformed expansion joints. No construction joints will be allowed. Expansion joints shall have an approved expansion joint sealer installed as detailed on the plans. Preformed expansion joints shall be continuous and of an approved material, and control joints shall be sawcut into the surface of the concrete. Expansion joints and control joints shall be placed as shown on the details.

The surface of the concrete shall receive a float finish in accordance with Subsection 502.14(A). Immediately following the float finish, the surface shall be textured at right angles to the roadway using an approved open-pile, stiff bristle broom or mat.

The curing period for the concrete shall be seven days and shall meet the requirements of Standard Specifications Section 502.15. The finished surface of the concrete shall receive a protective coating in accordance with Section 515.

502.18 Method of Measurement

Structural Concrete, Roadway Median and Structural Concrete, Roadway Truck Apron, satisfactorily placed and accepted, will be measured for payment by the cubic yard, in accordance with the dimensions shown on the plans or authorized by the Resident.

502.19 Basis of Payment

The accepted quantity of Structural Concrete, Roadway Median and Structural Concrete, Roadway Truck Apron, will be paid for at the contract unit price per cubic yard, which payment will be full compensation for all labor, materials, equipment and incidentals necessary to complete the work, including the fabrication, delivery, and placement of reinforcement; the furnishing and placement of expansion and contraction joints and joint sealant; and the furnishing and application of protective coating in accordance with Section 515.

Any grading or shimming of the existing subbase material that may be necessary after pavement removal to provide a suitable foundation shall be incidental. Excavation for the placement of Structural Concrete will be paid under the appropriate contract item, Section 203 – Excavation and Embankments.

Payment will be made under:

Pay Item		Pay Unit
502.341	Structural Concrete, Roadway Median	Cubic Yards
502.342	Structural Concrete, Roadway Truck Apron	Cubic Yards

SPECIAL PROVISION
SECTION 525
GRANITE MASONRY
(Granite Masonry Wall)

The provisions of Section 525 of the 2020 Standard Specifications with the following additions shall apply:

525.01 Description

This work shall consist of furnishing or salvaging and installing granite for monolithic granite benches, retaining walls and stairs as indicated on the Drawings, or as directed.

525.02 Materials

Salvaged granite will have been carefully removed, protected from damage, and put in temporary storage on-site, in approved areas.

New, off-site granite shall be supplied by Granites of America, 15 Branch Pike Smithfield, RI, or other authorized source. Sizes shall be as indicated on the Drawings. All exposed surfaces shall have a thermal finish; concealed faces shall be sawn. The specified color shall be Deer Isles.

525.021 Crushed Stone Base Course

Aggregate shall conform to MaineDOT Supplemental Specification 703.13 Crushed Stone ¾ inch.

525.022 Filter Fabric

Filter fabric shall be a non-woven stabilization/reinforcement geotextile that conforms to MaineDOT Standard Specifications, Section 620 Geotextiles.

525.07 Setting Stones

All setting shall be done by competent granite setters under adequate supervision and in accordance with the approved shop drawings.

Granite units with chips, cracks, stains, or other defects which might be visible in the finished work shall not be used. Before setting, granite shall be clean and free of dirt, and foreign matter on all sides. Granite shall be dry before setting.

Monolithic Granite Blocks shall be installed on a compacted layer of ¾" crushed stone. Grades shall be staked, and elevations shall be confirmed and approved by the Resident before granite is to be set. Granite shall be set true to the required lines and grades. Granite sections shall be set according to the details and locations indicated on the Drawings. Field measurements must

verify the wall length to the actual field conditions. Joints shall be uniform in thickness. Expansion joints shall be 1/2 in. wide. Unless otherwise indicated on the Drawings all other joints shall be 1/4 in. wide. Direct bearing contact between granite pieces shall be prohibited.

All joints except expansion joints shall be completely filled with mortar, then raked out to a depth of not less than 3/4 in. Raked joints shall be brushed clean and pointed with colored mortar to a flat cut joint. Mortar grout between granite pieces shall be uniform in appearance, texture, and color. After the initial set of mortar, joints shall be finished by tooling with a rounded, non-staining jointer to produce a glassy-hard, polished, slightly, concave joint, free of drying cracks.

Preformed joint filler shall be installed between granite units at expansion joint locations.

Exposed surfaces shall be kept free from mortar at all times. Any mortar smears shall be immediately removed with a clean sponge and clean water.

Holes, slots, and other sinkages for anchors, and dowels, shall be completely filled with mortar during setting of granite.

525.09 Method of Measurement

Monolithic Granite Blocks will be measured for payment by the linear foot of blocks set in place as directed. When multiple blocks are set adjacent to one another, measurement will be made along the front face of the blocks at the finish elevation for the entire run of blocks.

525.10 Basis of Payment

Monolithic Granite Blocks will be paid at the Contract Unit Price per linear foot complete in place and accepted. Such payment shall be full compensation for furnishing granite blocks and relocated salvaged granite blocks, furnishing and installing a compacted layer of ¾" crushed stone, and setting granite blocks as per the plans and as directed. Crushed stone will not be paid separately, but will be considered incidental to the granite blocks. Filter Fabric will be paid for under Section 620 Geotextiles.

Payment will be made under:

Pay Item		Pay Unit
525.10	Monolithic Granite Blocks	Linear Foot
525.11	Monolithic Granite Blocks – Salvaged	Linear Foot

SPECIAL PROVISION
SECTION 602
PIPE LINING
(Flowable Concrete Fill)

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Provide and install flowable fill material in authorized excavation(s) as shown on the Drawings and/or as specified herein.
B. Related Work Specified Elsewhere:
   1. Earthwork, excavation, backfilling, compaction, piping, manholes, testing and pavement are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

A. Perform work in accordance with ACI 229, Controlled Low-Strength Materials, or as specified here-in.

1.3 SUBMITTALS

A. Submit Mix designs for each mixture to be provided at least 15 days prior to production.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Materials shall meet the following requirements:
   1. Portland Cement, Type I or II - ASTM C150.
   2. Fly Ash (LOI limits do not apply) - ASTM C618.
   3. Fine Aggregate/Mineral Filler – ASTM C 33, ASTM or non-ASTM sands or mineral fillers with 100% passing the 1/2" sieve may be considered which produce an acceptable flow and desired performance characteristic. Soils with fine clays will not be considered. All other than ASTM C 33 materials must receive prior approval from the Engineer.
   4. Air Entraining Admixtures - As Per Manufacturer's Specifications.
   5. Light Weight Cellular Admixture - As Per Manufacturer's Specifications.
   6. Water – Potable or ASTM C 94.
   7. Preformed Foam – Procedures for evaluation ASTM C 796 and ASTM C 869.
B. Standard Flowable Fill:
   1. Compressive strength at 28 days less than 1200 psi
C. Excavatable Flowable Fill:
   1. Compressive strength at 28 days between 100-200 psi.
   2. Mix:
      a. Portland Cement: 50-100 lb/yd3
      b. Fly Ash: up to 350 lb/yd3, lime content not to exceed 10% by weight.
      c. Fine Aggregate/Mineral Filler: 2000-3000 lb/yd3

d. Water: 325-600 lb/yd3, for Class F fly ash and cement-only mixtures up to 1000 lb/yd3 may be acceptable.

D. Low Density Flowable Fill:
1. The preformed foam shall produce stable air cells capable of resisting the chemical and physical forces imposed during mixing, placing and setting.
2. Submit the foaming agent Manufacturer's recommended mixing procedures and approved mixing equipment to the Engineer.
3. Methods of placement must not cause a change in density due to loss of air content beyond predictable ranges.

PART 3 - EXECUTION

3.1 FLOWABLE FILL FOR ABANDONMENT OF PIPELINES AND MANHOLES

A. Flowable fill for pipe abandonment shall be excavatable or low density flowable fill as detailed in Section 2.1.

B. Abandoning and grouting of sewer mains and manholes must not occur until all existing sewer mains and manholes have been transferred to a relocated sewer main as designated in the Contract Documents. The Contractor will be responsible for the satisfactory coordination of the pipe abandonments with other construction and activities in the area. Delays in work resulting from lack of coordination will not be cause for additional compensation. Any work involving or impacting asbestos concrete pipe must be in accordance with the procedures outlined in the approved specifications for this project and will comply with all federal, state, and local laws, ordinances and regulations regarding the management of asbestos containing materials.

C. Remove all sewer manhole castings. These castings must be returned to the designated utility representative.

D. Make cuts, install bulkheads, vents to allow for air release.

E. Remove any free-standing water prior to starting fill placement.

F. Place grout/flowable fill using concrete or grout pumps capable of continuous delivery at planned placement rate to fill volume between placement points not to exceed 500 linear ft. at a time. Pump flowable fill through bulkheads constructed for placement to contain grout in line to be abandoned. These bulkheads will be used for injection points or vents during placement. Place grout under pressure into properly vented open system until grout emerges from vent pipes indicating pipe is completely filled. Pumping grout must be completed under sufficient pressure to overcome friction and to fill water main from downstream to upstream end. Remediate areas where flowable fill did not fill voids in sewer main by pressure grouting from inside sewer main or from surface if necessary. Plug each end of the sewer main being abandoned. Ensure that concrete is around plug/bulkhead and around pipe including bedding area such that it is not penetrable by groundwater and that bedding at this location is not a conduit for groundwater. The method of installation must be able to meet the requirement of completely filling the existing sewer main and any voids adjacent to it.

G. Remove, transport, and, dispose of spoils. Spoils, including pipe, must be hauled to a facility permitted to accept the material. The method must provide for the release of air. When intermediate points are required to be constructed for the abandonment

of the system, they must be a part of the abandonment project process. The method must provide for the isolation of sewer mains to be grouted from sewer mains that are abandoned in place without grouting as shown on the plans.

3.2 METHOD OF MEASUREMENT

A. Excavatable Flowable fill for abandoning in-place sewer mains and manhole structures measured for payment shall be the actual cubic yards of flowable fill placed for pipeline and manhole abandonment.

3.3 BASIS OF PAYMENT

A. The Contract unit price per cubic yard of flowable fill shall constitute full compensation for all labor, equipment, and materials necessary to complete this work including placement of the fill, including pumping, pipe preparation, curing, backfill, non-pressurized pipe caps, and all other requirements for safely capping and plugging the pipelines and manholes.

B. Payment will be made under:

Pay Item		Pay Unit
602.30	Flowable Concrete Fill	Cubic Yard

SPECIAL PROVISION
SECTION 603
PIPE CULVERTS AND STORM DRAINS

603.12 Basis of Payment: This section shall be amended with the addition of the following:

Pay Item		Pay Unit
603.155	12 Inch Reinforced Concrete Pipe Class III	Linear Foot

SPECIAL PROVISION
SECTION 604
MANHOLES, INLETS, AND CATCH BASINS
(Catch Basin Type P)

The provisions of Section 604 of the 2020 Standard Specifications with the following additions shall apply:

604.06 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
604.071	Catch Basin Type A1-P	Each
604.091	Catch Basin Type B1-P	Each
604.251	Catch Basin Type A5-P	Each

SPECIAL PROVISION
SECTION 606
GUARDRAIL
(Timber Guardrail)

The provisions of Section 606 of the 2020 Standard Specifications with the following additions shall apply:

606.01 Description

This work consists of furnishing and installing timber guardrail, mounted on a concrete retaining wall, as indicated and detailed on the Drawings, and as specified herein.

606.02 Materials

606.021 Lumber

Lumber shall be Premium Grade Black Locust, sized as indicated on the drawings, furnished S4S-E4E (surfaced four sides-eased four edges) of sound stock, new, straight, of consistent size, free of stains and mildew, and kiln dried to a moisture content of not more than 12%, by weight. Wood members shall be selected for best possible appearance from the grade of stock specified.

Each individual piece shall be carefully inspected to ensure premiere quality, durability and appearance. Black Locust shall display acceptable characteristics such as knots, mineral streaks, checks, and bark insertions. To ensure premiere appearances, only the most appealing members shall be admitted in this grade, giving the best appearance with outstanding durability. The most beautiful knots, 3" in diameter and less shall be admitted. Minor mineral streaks and small bark insertions shall also be admitted, along with checks less than 1/12 of the board length.

Acceptable Manufacturer/Supplier: Black Locust Lumber Products, 6395 S.R. 103 North Lewistown, Pennsylvania, 17044; Phone: (908) 735-9645; Fax: (908) 735-6893; web: blacklocustlumber.com; email: info@blacklocustlumber.com, or other approved source.

Lumber shall bear the grade-trademark of the association under the rules or standards of which they were produced. Grade trademarks shall conform to the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.

Grades specified are the minimum acceptable. Lumber grades shall be determined in accordance with ASTM D 245.

Lumber shall bear the grade mark of an American Lumber Standards Committee, Board of Review-approved agency. Lumber shall conform to USDC PS 20. Lumber shall bear a mark of mill identification.

606.022 Steel

Steel posts and mounting plates shall be Preweathered Corten Steel, a high-strength, low-alloy, atmospheric-corrosion-resistant structural steel, commonly called weathering steel, Grade 50 with a minimum yield stress of 50 ksi (345 MPa) conforming to ASTM A 588/A 588M.

Corten steel shall have a "preweatehred", pre-oxidized surface produced by accelerating the natural weathering process and stabilizing the result, such as Solanum Steel, manufactured by Zahner, 1400 East 9th Street, Kansas City, MO 64106; 1-816-474-8882, or an approved equal.

606.023 Hardware

The Contractor shall provide type 316 stainless steel hardware, capable of creating a secure and rigid attachment, including all brackets, anchors, anchor bolts, thru bolts, washers, nuts, nails, and other hardware. Rough hardware shall comply in all respects with requirements of the governing laws and codes.

606.024 Electrolytic Separation/Corrosion Resistance

Where dissimilar metals are to come into contact with one another, isolate by application of a heavy coating of bituminous paint on contact surfaces in addition to shop coat specified. Do not permit the bituminous paint in any way to remain on surfaces to be exposed or to receive sealant.

Coating for electrolytic separation between steel and concrete and grout shall be an approved high-build coal tar epoxy providing one coat protection for steel and concrete in a variety of chemical, immersion and underground conditions.

606.025 Submittals

Prepare shop drawings indicating profiles, sizes, connection attachments, and types of fasteners in accordance with Section 105.7 – Working Drawings.

Submit product data consisting of complete manufacturers product description and specifications. Submit certificates of grading, and conformance to specified standards.

606.026 Delivery and Storage

Materials when delivered to site shall be stacked and stored above the ground under protective coverings or indoors in such manner as to ensure proper drainage, ventilation, and protection.

Wood materials shall be stored on elevated piles to allow for air circulation below and tipped in one direction to effectively drain moisture. Lumber shall be wrapped completely, including bottoms, in waterproof tarps. Tarps shall be tied down to protect against wind blow-off. Should delays in Project be anticipated, lumber shall be stored in covered storage.

606.04 Rails

The Contractor shall be responsible for structural integrity, connections, and anchorage of the timber guardrail. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, or not adequately seasoned.

606.08 Method of Measurement

Timber Guardrail and all necessary hardware and incidentals will be measured for payment by the linear foot, from center to center of end posts along the gradient of the rail, installed and accepted in place.

606.09 Basis of Payment

The quantity of Timber Guardrail will be paid for by the contact unit price per linear foot, complete and accepted in place. Such payment will be full compensation for furnishing and the required lumber, steel, and hardware components required for anchorage and installation, the coating for electrolytic separation, and all labor, tools, hardware and other incidentals necessary to complete the work. The concrete retaining wall will be paid under the appropriate 502 bid item.

Payment will be made under:

Pay Item		Pay Unit
606.611	Timber Guardrail	Linear Foot

SPECIAL PROVISION
SECTION 607
FENCES
(Temporary Chain Link Fence)

The provisions of Section 607 of the 2020 Standard Specifications with the following additions shall apply:

607.01 Description

This work shall consist of furnishing, erecting, maintaining, moving when necessary, and removing a temporary, movable chain link fence and gates.

607.03 General

The temporary fence shall be moveable (not installed with driven posts) as there is scope shared between the MaineDOT and Northeastern on either side of the fence line. This includes, but is not limited to paving, hardscaping, tie-ins for sidewalks and roadways, light poles and bases, and plantings.

The fence shall have several gates for access purposes.

Generally, the fence will be located ten feet (towards the campus) from the perimeter path to allow sufficient space for construction activities. As necessary, the fence will encompass the work area on the outer (away from the campus) side of the path, along the limits of work.

Primary access through the fence will be from Sherwood Street, along the western property line of Northeastern University.

607.06 Method of Measurement

Temporary Chain Link Fence – 6' will be measured by the linear foot for all fence authorized and installed. Measurement will be along the gradient of the fence and shall include fence at bracing assemblies and gates and barways.

607.07 Basis of Payment

The accepted quantity of fence will be paid for at the contract unit price per linear foot. Barways, gates, and bracing assemblies will not be paid for separately, but will be considered incidental. Payment shall be full compensation for furnishing and assembling all materials, moving the fence as necessary, installing gates or openings as necessary, for excavating and backfilling holes, and for all incidentals necessary to complete the work. Removal of the Temporary Chain Link Fence will not be paid for separately but shall be included in the Contract Unit Price.

Payment will be made under:

Pay Item		Pay Unit
607.1701	Temporary Chain Link Fence – 6’	Linear Foot

SPECIAL PROVISION
SECTION 608
SIDEWALKS
(Reinforced Concrete Sidewalk - Vehicular)

The provisions of Section 608 of the 2020 Standard Specifications with the following additions shall apply:

608.031 Portland Cement Concrete Sidewalk

Concrete sidewalks shall be built to the sizes and dimensions as shown on the plans, utilizing reinforcement as shown in the plans, or as directed.

608.05 Method of Measurement

Reinforced Concrete Sidewalk, both Pedestrian and Vehicular will be measured by the square yard of finished surface.

608.06 Basis of Payment

The accepted quantities of sidewalk will be paid for at the Contract Unit Price per square yard for Reinforced Concrete Sidewalk, both Pedestrian and Vehicular, complete and in place.

Reinforcement for reinforced concrete sidewalks will not be paid for separately, but shall be included in the Contract Unit Price for the related items.

Payment will be made under:

Pay Item		Pay Unit
608.08	Reinforced Concrete Sidewalk - Pedestrian	Square Yard
608.08	Reinforced Concrete Sidewalk - Vehicular	Square Yard

SPECIAL PROVISION
SECTION 608
SIDEWALKS
(Granite Cobbles with Bituminous Base)

The provisions of Section 608 of the 2020 Standard Specifications with the following additions shall apply:

608.10 Description

This work shall consist of furnishing and installing granite cobbles on a bituminous concrete base with sand swept joints as indicated on the Drawings and as specified herein.

608.20 Materials

608.21 Geotextile

Filter fabric shall be a non-woven stabilization/reinforcement geotextile that conforms to MaineDOT Standard Specifications, Section 620 Geotextiles.

608.22 Aggregate

New aggregate shall conform to MaineDOT Supplemental Specification 703.06(a), Aggregate for base, Type B, and meet the requirements of MaineDOT Standard Specifications, Section 304 Aggregate Base and Subbase Course.

608.22 Bituminous Concrete HMA Base Course

Bituminous Concrete shall meet the requirements of MaineDOT Standard Specifications, Section 403 Hot Mix Asphalt Pavement.

608.23 Neoprene-Modified Asphalt Adhesive

Paving manufacturer's standard adhesive consisting of oxidized asphalt combined with 2 percent neoprene and 10 percent long-fibered mineral fibers containing no asbestos. Neoprene modified asphalt adhesive shall meet the following requirements:

Mastic (asphalt adhesive):

- Solids (base) content by volume = 75+ 1%.
- Weight = 8 to 8.5 lb./gal.
- Solvent vehicle = Varsol (over 100 degrees Fahrenheit flash).

Base (2% neoprene, 10% fibers, 88% asphalt):

- Melting point (ASTM D 36) = 200 degrees Fahrenheit, minimum.
- Penetration at 77 degrees Fahrenheit. 100-gram load 5 second (0.1 mm) = 23 to 27.
- Ductility (ASTM D 113 at 25 degrees Celsius, 5 cm/minute) = 125 cm, minimum

608.24 Edge Restraint

Edge Restraints shall meet the requirements of Special Provision Section 621 Metal Landscaping Edging.

608.25 Granite Cobbles

Granite cobbles shall be Deer Isle Granite, supplied by Granites of America, or approved equal. Cobble shall be obtained from a single source to provide a product of consistent quality in appearance and physical properties.

Granites of America, 15 Branch Pike Smithfield, RI 02917;
Email: info@granitesofamerica.com; Phone: (401) 232-2040.

Granite shall be sound and uniform in quality, texture, and strength, and shall be free of any flaws, reeds, rifts, laminations, seams, or defects which would impair its strength, durability, or appearance. The absorption by weight shall not exceed 0.4%. Compressive strength shall not be less than 19,000 psi. Minimum density shall be 160 pcf.

The Contractor shall submit to the Resident two granite cobbles for each size, full size and thickness, of the specified color and finish.

608.26 Sand for Joint Filler

Sand shall be a clean, washed, uniformly well graded masonry sand conforming to ASTM C 144, except that the fineness modulus shall be 2.25+ 0.10. The sand shall meet the requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
No. 16	100
No. 200	0 - 10

Sand shall be from a single source. The source of the supply shall not be changed during course of job without written permission from the Resident. The color of sand shall be uniform and shall be approved by the Resident.

608.30 Mock-up

Unless authorized otherwise, the Contractor shall provide for acceptance, an 8’ x 8’ mock-up of the granite cobbles used for each application, prior to the start of cobble installation. The mock-up panels shall be located in a non-public area accepted by the Resident and shall be protected from damage until the completion and acceptance of the work represented by the mock-up.

Additional mock-ups shall be constructed until an acceptable mock-up is produced. The accepted mock-up shall be the standard for the entire job. The panel shall exhibit the specified base, thickness, colors, jointing, pattern, finish, and workmanship.

Remove the mock-up panels from site at completion of the project as directed by the Resident.

608.40 Installation, General

Do not use frozen materials or materials mixed or coated with ice or frost. Do not build over frozen subgrade. Remove and replace cobble work damaged by frost or freezing.

Granite cobbles shall be carefully packed and loaded for shipment and all necessary precautions taken against damage in transit and handling. Do not use cobbles with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work. Granite cobbles damaged in any manner will be rejected and replaced with new materials at no additional cost.

Aggregate materials shall be kept dry and free from soiling.

The Contractor shall examine the bituminous concrete base to determine its adequacy to receive adhesive and granite cobbles. Evidence of an inadequate base shall be brought to the immediate attention of the Resident.

Clean substrates to remove dirt, dust, debris, and loose particles, and remove substances from substrates, that could impair bond.

608.0373 Installation, Modified Asphalt Adhesive

Apply neoprene-modified asphalt adhesive to compacted bituminous concrete base by squeegeeing or troweling. If troweled on, use trowel with serrations not exceeding 1/16 inch. Proceed with setting of paving units only after adhesive is dry to the touch.

608.0373 Installation, Granite Cobbles

Granite cobbles shall be set onto the adhesive layer over a prepared base.

After the modified asphalt adhesive is applied, carefully place the cobbles by hand in straight courses with hand tight joints and uniform top surface. Granite cobbles shall be set true to the required lines and grades in the pattern detailed on the Drawings. Granite cobbles shall be neatly cut and fitted at all perimeters and closures to fit neatly and closely, with joints uniform in thickness.

All surface and pavement structures shall be true to the lines and levels, grades, thickness and cross sections shown on the drawings. All pavements shall be finished to lines and levels to ensure positive drainage at all drainage outlets and channels. The final surface elevations shall

not deviate more than 3/8 inch under a 10 foot long straight edge, nor exceed 1/32 inch unit-to-unit offset from flush (lippage). The surface elevation of cobbles shall be 1/8 to 1/4 inch above adjacent drainage inlets, concrete collars or channels.

608.0373 Installation, Joint Filler

The Contractor shall spread sand for joint filler with a hard-bristle broom. Make sure the sand completely fills the joints. Do not use other materials in the joints. Leave a layer of sand on the surface to aid in the vibrating and consolidation of the sand into joints.

The Contractor shall vibrate the sand into the cobble joints using a vibratory plate compactor utilizing a rubber pad. Joints should be filled up to 1/8 inch below the edge or chamfer. The Contractor shall compact in several directions to ensure there are no air gaps or voids in the joints. Repeat spreading sand and vibrating to ensure joints are filled and consolidated. Narrow joints require more care to completely fill.

The Contractor shall sweep off excess sand from the paved surface, first with a hard-bristle broom, then a soft-bristle broom. The height of the sand shall be left at least 1/8 inch below the edge or chamfer of the cobbles.

608.0374 Clean up

After completion of the granite cobbles, paved areas shall be thoroughly swept clean and surface shall be left unsoiled. Where required, surface shall be cleaned with water or an approved cleaner.

608.05 Method of Measurement

Granite Cobbles with Bituminous Base will be measured for payment complete and in place, by the square yard of finished surface.

608.06 Basis of Payment

The accepted quantity of Granite Cobbles with Bituminous Base will be paid for at the contract unit price per square yard, complete in place which price will be full compensation for furnishing all equipment, materials, and labor to apply an asphalt adhesive, install granite cobbles, and fill joints with sand in accordance with the plans and these specifications. Filter fabric will be paid for under Section 620 Geotextiles. The aggregate base and subbase will be paid for under Section 304 Aggregate Base and Subbase Course. The bituminous concrete base course will be paid for under Section 403 Hot Mix Asphalt Pavement.

Payment will be made under:

Pay Item		Pay Unit
608.272	Granite Cobbles with Bituminous Base	Square Yard

SPECIAL PROVISION
SECTION 608
SIDEWALKS
(Granite Pavers with Concrete Base)

The provisions of Section 608 of the 2020 Standard Specifications with the following additions shall apply:

608.10 Description

This work shall consist of furnishing and installing granite pavers on a sand setting bed over a reinforced, perforated concrete base, with sand swept joints as indicated on the Drawings and as specified herein.

608.20 Materials

608.21 Aggregate

New aggregate shall confirm to MaineDOT Supplemental Specification 703.06(a), Aggregate for subbase, Type B, and meet the requirements of MaineDOT Standard Specifications, Section 304 Aggregate Base and Subbase Course.

608.22 Concrete Base

Concrete shall meet the requirements of MaineDOT Standard Specifications, Section 502 Structural Concrete.

Reinforcing Steel shall meet the requirements of MaineDOT Standard Specifications, Section 503 Reinforcing Steel.

608.23 Drain Stone

Drain stone for filling vertical weeps shall be crushed stone with 90% fractured faces, an LA Abrasion of less than 40 (ASTM C131), and a minimum CBR of 80% (ASTM D1883). Rounded river gravel is not acceptable. All stone material shall be washed such that less than 1% by weight passes the No. 200 sieve. The gradation shall conform to the following:

Sieve Size	% Passing by Weight
37.5 mm (1 ½")	100
25 mm (1")	95 – 100
12.5 mm (½")	25 – 60
4.75 mm (No. 4)	0 – 10
2.36 mm (No. 8)	0 – 5

608.24 Geotextile

Filter fabric shall be a non-woven stabilization/reinforcement geotextile that conforms to MaineDOT Standard Specifications, Section 620 Geotextiles.

608. 25 Sand Setting Bed

Sand shall be a clean, sharp, natural sand conforming to ASTM C33, except that the fineness modulus shall be 2.25 +/- 0.10. The gradation shall conform to the following:

Sieve Size	% Passing by Weight
3/8”	100
No. 4	95 – 100
No. 8	80 – 100
No. 16	50 – 85
No. 50	10 – 30
No. 100	5 – 15
No. 200	0 – 10

608.26 Edge Restraint

Edge Restraints shall meet the requirements of Special Provision Section 621 Metal Landscaping Edging.

608.27 Granite Pavers

Granite pavers shall be Deer Isle Granite, supplied by Granites of America, or approved equal. Pavers shall be obtained from a single source to provide a product of consistent quality in appearance and physical properties.

Granites of America, 15 Branch Pike Smithfield, RI 02917;
Email: info@granitesofamerica.com; Phone: (401) 232-2040.

Granite shall be sound and uniform in quality, texture, and strength, and shall be free of any flaws, reeds, rifts, laminations, seams, or defects which would impair its strength, durability, or appearance. The absorption by weight shall not exceed 0.4%. Compressive strength shall not be less than 19,000 psi. Minimum density shall be 160 pcf.

The Contractor shall submit two granite pavers for each size, full size and thickness, of the specified color and finish.

608.28 Sand for Joint Filler

Sand shall be a clean, washed, uniformly well graded masonry sand conforming to ASTM C 144, except that the fineness modulus shall be 2.25+ 0.10. The sand shall meet the requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
No. 16	100
No. 200	0 - 10

Sand shall be from a single source. The source of the supply shall not be changed during course of job without written permission from the Resident. The color of sand shall be uniform and shall be approved by the Resident.

608.30 Mock-up

Unless authorized otherwise, the Contractor shall provide for acceptance, a 10' x 10' sample panel of each type of granite unit paving on the specified base, prior to the start of any granite paving. The mock-up panels shall be located in a non-public area accepted by the Resident and shall be protected from damage until the completion and acceptance of the work represented by the mock-up.

Additional mock-ups shall be constructed until an acceptable mock-up is produced. The accepted mock-up shall be the standard for the entire job and shall remain undisturbed until completion of all granite paving. The panel shall exhibit granite pavers, grain and grain direction, and required jointing and relationship to adjacent paving.

Remove the mock-up panels from site at completion of the project as directed by the Resident.

608.40 Installation, General

Remove any ice or snow formed on granite or concrete bed by carefully applying heat until its top surface is dry to touch. Remove granite work determined to be damaged by freezing conditions.

Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen work. During all seasons, protect partially completed granite work against weather when work is not in progress.

Granite shall be carefully packed and banded by the supplier for shipment. Following shipping granite shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Skids and pallets shall be placed and stacked in such a manner as to evenly distribute the weight of the granite materials and to prevent breakage, cracking, and damage to granite pieces. Granite materials shall be stored in such a manner as to

allow air to circulate around the granite material. Granite shall not be permitted to be in direct contact with the ground any time during storage. Granite damaged in any manner will be rejected and replaced with new materials at no additional cost to the project.

Finished surfaces adjacent to the paving work shall be adequately protected from soiling, staining, and other damage.

The granite paving layout indicated on the Drawings is approximate. The final configuration of the paving will be determined in the field by the Resident.

Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures. Pavers shall be cut with a motor-driven, water-cooled, cut-off wheel masonry saw using a diamond blade to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

608.41 Concrete Base

Concrete Base formwork, placement and curing shall meet the requirements of MaineDOT Standard Specifications, Section 502 Structural Concrete.

Concrete Base reinforcing steel placement shall meet the requirements of MaineDOT Standard Specifications, Section 503 Reinforcing Steel.

The Contractor shall examine the concrete base to determine its adequacy to receive granite pavers and setting bed. Evidence of inadequate base shall be brought to the immediate attention of the Resident.

Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.

608.42 Setting Granite Pavers on Sand Setting Bed

The Contractor shall install a non-woven geotextile filter fabric in accordance with MaineDOT Standard Specifications, Section 620 Geotextiles.

The Contractor shall install edge restraints as directed and in accordance with Special Provision Section 621 Metal Landscaping Edging.

The Contractor shall place a leveling course of setting bed sand and screed to a thickness of 1 to 1½ inches, taking care that the moisture content remains constant and the density is loose and constant until the pavers are set and compacted.

Granite pavers with chips, cracks, stains, voids, discolorations, or other defects that might be visible or cause staining in the finished work shall not be used. Before setting, granite pavers shall be dry and clean, and free of dirt and foreign matter on all sides.

Set pavers hand tight with 1/8" joints spaced with 1/8" black poly spacers held 1 ½" below grade, without disturbing the leveling base.

Unless otherwise directed by the granite supplier, vibrate pavers into the leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz. Perform at least three passes across the pavers with the vibrator. Vibrate after edge pavers are installed and there is a completed surface, or before the surface is exposed to rain. Vibrate before ending each day's work, fully compacting installed granite pavers to within 36 inches of the laying face. Cover open layers with nonstaining plastic sheets overlapped 48 inches on each side of the laying face to protect it from rain.

All surface and pavement structures shall be true to the lines and levels, grades, thickness and cross sections shown on the drawings. All pavers shall be finished to lines and levels to ensure positive drainage at all drainage outlets and channels. The final surface elevations shall not deviate more than 1/8 inch under a 10 foot long straight edge, nor exceed 1/32 inch unit-to-unit offset from flush (lippage).

608.0373 Installation, Joint Filler

The Contractor shall spread sand for joint filler with a hard-bristle broom. Make sure the sand completely fills the joints. Do not use other materials in the joints. Leave a layer of sand on the surface to aid in the vibrating and consolidation of the sand into joints.

The Contractor shall vibrate the sand into the paver joints using a vibratory plate compactor utilizing a rubber pad. Joints should be filled up to 1/8 inch below the edge or chamfer. The Contractor shall compact in several directions to ensure there are no air gaps or voids in the joints. Repeat spreading sand and vibrating to ensure joints are filled and consolidated. Narrow joints require more care to completely fill.

The Contractor shall sweep off excess sand from the paved surface, first with a hard-bristle broom, then a soft-bristle broom. The height of the sand shall be left at least 1/8 inch below the edge or chamfer of the paver.

Repeat the joint-filling process 30 days later.

608.0374 Adjust and Clean

Remove and replace granite pieces which are broken, chipped, stained, or otherwise damaged. Remove and replace units which are misaligned or not to grade or do not match adjoining granite work. Provide new matching units, install as specified and point-up joints, or refill with sand to eliminate evidence of replacement. Repair defective and unsatisfactory joints as required to provide a neat, uniform appearance.

Clean granite work not less than six days after completion of work, using clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents, or other cleaning compounds with caustic or harsh fillers

608.05 Method of Measurement

Granite Pavers with Concrete Base will be measured for payment complete and in place, by the square yard of finished surface.

608.06 Basis of Payment

The accepted quantity of Granite Pavers with Concrete Base will be paid for at the contract unit price per square yard, complete in place which price will be full compensation for furnishing all equipment, materials, and labor to core and fill vertical weeps, install the sand setting bed, install granite pavers, and fill joints with sand in accordance with the plans and these specifications. The aggregate base and subbase will be paid for under Section 304 Aggregate Base and Subbase Course. Filter fabric will be paid for under Section 620 Geotextiles. The concrete base course will be paid for under Section 608 Reinforced Concrete Sidewalk - Vehicular.

Payment will be made under:

Pay Item		Pay Unit
608.282	Granite Pavers with Concrete Base	Square Yard

SPECIAL PROVISION
SECTION 609
CURB
(Granite Curb Type 1)

The provisions of Section 609 of the 2020 Standard Specifications with the following additions shall apply:

609.10 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
609.121	Vertical Curb Type 1 – Granite Radius Corner	Each
609.221	Terminal Curb Type 1	Linear Foot
609.222	Terminal Curb Type 1 – Circular	Linear Foot

SPECIAL PROVISION
SECTION 609
CURB
(Curb Type 5 - Truck Apron)

The provisions of Section 609 of the 2020 Standard Specifications with the following additions shall apply:

609.01 Description

This work shall consist of installing Curb Type 5 around the perimeter of the truck apron, as shown on the plans.

609.06 Stone Edging

The curb shall be set at a 4:1 slope with a 3-inch reveal. The curb shall be placed on 16"x8"x4" precast concrete supports. Two supports will be required per section of curb. Grout or shims shall be used in order to set the curb to grade prior to placing Class A concrete bedding. Details for precast concrete supports and pay limits for concrete are as shown on the plans.

609.09 Method of Measurement

Curb Type 5 – Truck Apron will be measured by the linear foot along the front face of the curb.

609.10 Basis of Payment

The accepted quantity of Curb Type 5 – Truck Apron will be paid for at the contract unit price per linear foot, complete in place. Payment shall be full compensation for furnishing curb, Class A concrete bedding, precast concrete supports, grout, shims, and all labor and incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item		Pay Unit
609.341	Curb Type 5 – Truck Apron	Linear Foot

SPECIAL PROVISION
SECTION 610
STONE FILL, RIPRAP, STONE BLANKET, AND STONE DITCH PROTECTION
(Riprap Material)

The provisions of Section 610 of the 2020 Standard Specifications with the following additions shall apply:

610.02 Materials

Stone for Special Riprap shall consist of hard, sound durable rock that will not disintegrate by exposure to water or weather. Stone for Special Riprap shall be angular and rough. Rounded, subrounded or long thin stones will not be allowed. The maximum allowable length to width ratio will be 3:1. Stone for Special Riprap may be obtained from quarries or by screening oversized rock from earth borrow pits.

Stone shall be well graded and conform to the size requirements shown on the Drawings.

610.06 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
610.163	Special Riprap	Cubic Yard

SPECIAL PROVISION
SECTION 615
LOAM
(Planting Soils)

The provisions of Section 615 of the 2020 Standard Specifications with the following additions shall apply:

615.01 Description

This work shall consist of subgrade preparation, installation of drainage layer and panel drains, acquisition and manufacturing of planting soil material, and installation of planting soils. Testing of existing conditions, testing and analysis of material, and final in-place testing shall be part of this item.

The Resident or the designated project Soil Scientist has the authority and responsibility to assure that the Contractor performs all Work in conformity with the Contract, the Drawings, and these specifications. The Resident or the Soil Scientist will have the final authority to decide all questions regarding the quality and acceptability of the planting soil materials furnished.

615.02 Materials

The Lawn and Planting Soils shall be composed of a blend of three base components: base loam, sand, and organic material (compost). The quality of the blend depends on the quality of the original components. The Contractor is responsible for locating and obtaining approval of the base components that meet the Specification requirements. The Contractor shall mix the components at an off-site location. Approximate mixing ratios are provided, but may require adjustment, with the approval of the Resident or their representative, depending on the final materials in order to meet the Specification requirements for each blend.

615.021 General

All existing vegetation shall be removed from stockpiles prior to blending. Uniformly mix ingredients by windrowing/tilling on an approved hard surface area or by alternately processing materials through a screening plant. All soil components and organic amendments shall be maintained in a uniformly moist but not saturated condition during mixing. Percentages of components are approximate and will be verified upon completion of individual test results for components of the various mixes. Due to variability of soil materials, mix ratios may require adjustment and samples shall be resubmitted at the expense of the Contractor.

Amendments shall not be added unless approved by the Resident or Soil Scientist and additional tests have been conducted to verify type and quantity of amendments are acceptable. Biosolids and their byproducts will not be allowed for use as an amendment to the soil.

After component percentages are confirmed by the Resident or Soil Scientist, each planting soil mix shall be tested for physical and chemical analysis. Component percentages may be modified at any time by the Soil Scientist dependent upon the results of testing of the various components or final blends.

615.022 Base Loam

As required for mixing with Sand and Compost to produce the Planting Soil Blends as specified below, Base Loam shall be a naturally occurring soil formed from geologic soil forming processes without admixtures of sand or organic matter sources (composts). Base Loam shall be free of subsoil, Horizon B and C, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Base Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Base Loam shall not be delivered or used for blending while in a frozen or muddy condition. The maximum size shall be one-inch largest dimension. The amount retained on the #10 sieve shall not be greater than 15% by weight of the total sample. Base Loam for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

Sieve Size	% Passing by Weight
No. 10	100
No. 18	85 – 100
No. 35	70 – 95
No. 60	50 – 85
No. 140	36 – 53
No. 270	32 – 42
0.002mm	0 – 0.5

Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 (obsolete), ASTM 6913, or ASTM D7928 after destruction of organic matter by ignition.

The ratio of the particle size for 80 percent passing (D80) to the particle size for 30 percent passing (D30) shall be 8 or less (D80/D30 <8).

The organic content shall be between 4.0 and 8.0 percent by weight.

Chemical analysis shall be undertaken for Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

615.023 Medium to Coarse Sand (washed concrete sand)

Sand for Planting Soil Blends, protection of filter fabric and Drainage as required, shall be uniformly graded medium to coarse sand consisting of clean, inert, rounded to sub-angular grains of quartz or other durable rock free from loam or clay, mica, surface coatings and deleterious materials. Washed concrete sand typically meets these Specification Requirements. The maximum size shall be one-inch largest dimension. The amount retained on the #10 sieve shall not be greater than 20% by weight of the total sample. The grain size distribution for material passing the #10 sieve shall conform with the following:

Sieve Size	% Passing by Weight
No. 10	100
No. 18	60 – 80
No. 35	25 – 45
No. 60	8 – 20
No. 140	0 – 8
No. 270	0 – 8
0.002mm	0 – 0.5

Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 (obsolete), ASTM 6913, or ASTM D7928 after destruction of organic matter by ignition.

The ratio of the particle size for 70 percent passing (D70) to the particle size for 20 percent passing (D20) shall be 2.8 or less (D70/D20 <2.8).

pH shall be less than 7.5.

615.024 Organic Amendment (Compost)

Organic Matter for amending planting soils shall be a stable, humus-like material produced by the aerobic decomposition and curing of Leaf Yard Waste Compost, composted for a minimum of one year (12 months). The leaf yard waste compost shall be free of debris such as plastics, metal, concrete, stones larger than 1/2", larger branches, roots, or other debris. Wood chips over 1" in length or diameter shall be removed by screening. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with the addition of fertilizer and other amendments as applicable. The compost shall have no visible free water or dust, no unpleasant odor, and meet the following criteria as reported by laboratory tests.

a. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1.
b. Stability shall be assessed by the Solvita procedure. Protocols are specified by the Solvita manual (version 4.0). The compost must achieve a maturity index of 6 or more as measured by the Solvita scale. Stability tests shall be conducted by an approved laboratory.

c. Organic Content shall be at least 20 percent (dry weight). One hundred percent of the material shall pass a 1/2-inch (or smaller) screen. Organic content shall be determined by weight loss on ignition.
d. pH: The pH shall be between 6.5 to 7.4 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter in accordance with the *Methods of Soil Analysis* published by the American Society of Agronomy (ASA).
e. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.5 mmhos/cm (dS/m).
f. The compost shall be screened to 1/2-inch maximum particle size and shall contain no more that 3 percent material finer than 0.002mm as determined by hydrometer test on ashed material.
g. Nutrient content shall be determined by the Soil Testing Laboratory and utilized to evaluate soil-required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.
h. Compost shall not contain phytotoxic levels of residual herbicides or pesticides and shall not contain levels of oil or hazardous material (OHM) above State published levels established for use in residential applications.
i. Biosolids and their byproducts will not be permitted.

615.025 Planting Soils: Planting Bed Soil

Planting Bed Soil shall consist of a combination of approximately equal parts by volume of Imported Base Loam, Coarse Sand, and Organic Amendment/Compost (1L:1S:1C) to create a uniform blend.

The maximum size shall be one half-inch largest dimension. The amount retained on the #10 sieve shall not be greater than 10% by weight of the total sample. The final gradation of material passing the #10 sieve shall conform with the following:

Sieve Size	% Passing by Weight
No. 10	100
No. 18	85 – 95
No. 35	60 – 85
No. 60	42 – 65
No. 140	21 – 44
No. 270	18 – 24
0.002mm	2 – 5

The final mix shall have an organic content between 5 and 7 percent by weight.

The final mix shall have a hydraulic conductivity of not less than 1.5 inches per hour according to test procedure ASTM D5856-95 (2000) when compacted to a minimum of 86 percent of a Standard Proctor ASTM D 698. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 (obsolete), ASTM 6913, or ASTM D7928. after destruction of the organic matter by ignition.

Chemical analysis shall be undertaken for Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

pH shall be between 6.0 and 7.0.

615.026 Planting Soils: Horticultural Subsoil

Horticultural Subsoil for the lower layer of planting soil in Planting Beds shall consist of a combination by volume of approximately two parts Coarse Sand to one part Imported Base Loam (2S:1L).

The maximum size shall be one-inch largest dimension. The amount retained on the #10 sieve shall not be greater than 20% by weight of the total sample. The gradation of material passing the #10 sieve shall conform with the following:

Sieve Size	% Passing by Weight
No. 10	100
No. 18	85 – 95
No. 35	55 – 80
No. 60	30 – 60
No. 140	20 – 33
No. 270	12 – 17
0.002mm	1 – 3

The ratio of the particle size for 80 percent passing (D80) to the particle size for 30 percent passing (D30) shall be 6.5 or less (D80/D30 <6.5).

The organic content shall be between 1.5 and 3.0 percent by weight.

The final mix shall have a hydraulic conductivity of not less than 2 inches per hour according to test procedure ASTM D5856-95 (2000) when compacted to a minimum of 86 percent of a Standard Proctor ASTM D 698.

Chemical analysis shall be undertaken for Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

pH shall be between 6.0 and 6.8.

615.027 Planting Soils: Lawn Soil

Lawn Soil shall consist of a blend by volume of approximately two parts Coarse Sand to one and one-half parts Base Loam and one part Organic Amendment/Compost (2S:1.5L:1C).

The maximum size shall be one-inch largest dimension. The amount retained on the #10 sieve shall not be greater than 15% by weight of the total sample. The gradation of material passing the Number 10 sieve shall conform with the following:

Sieve Size	% Passing by Weight
No. 10	100
No. 18	70 – 90
No. 35	45 – 72
No. 60	26 – 40
No. 140	18 – 22
No. 270	14 – 18
0.002mm	2 – 6

The ratio of the particle size for 70 percent passing (D70) to the particle size for 20 percent passing (D20) shall be 5.5 or less (D70/D20 <5.5).

The organic content shall be between 4.0 and 5.5 percent by weight.

The final mix shall have a hydraulic conductivity of not less than 3 inches per hour according to test procedure ASTM D5856-95 (2000) when compacted to a minimum of 86 percent of a Standard Proctor ASTM D 698.

Chemical analysis shall be undertaken for Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

pH shall be between 6.2 and 6.8.

615.028 Free-Draining Sand and Gravel (For drainage)

Based on subgrade conditions and the results of subgrade percolation testing, a drainage layer with panel drains may be required in certain areas of the project site. The drainage layer is a layer of specified sand, or sand and gravel, placed below planting soils to facilitate drainage and to control groundwater. A layer of specified sand or sand and gravel may also be required for use as fill below the lawn and planting soils to achieve subgrade elevations. Free-draining sand and gravel borrow shall consist of inert, hard, durable stone and coarse sand, free from loam, clay, mica, surface coatings and deleterious materials and shall conform with the following gradation:

Sieve Size	% Passing by Weight
3 inch	100
½ inch	60 – 100
No. 4	40 – 100
No. 50	8 – 28
No. 200	0 – 5

Sand and gravel borrow shall be placed in lifts not more than nine inches thick before compaction. Compaction shall be by vibration to a density between 90 and 95% Standard Proctor. Saturated hydraulic conductivity of the sand and gravel shall be not less than 15 inches per hour according to ASTM D5856-95 (2000) when compacted to a minimum of 95% Standard Proctor, ASTM 698

615.029 Existing Topsoil salvage

Based on a pre-construction survey, there is little existing topsoil available at the project site. The existing topsoil on site is composed of a gravelly loam. It is not anticipated that the existing topsoil will be re-used on site as a component within soil blends. The Contactor shall consult with the Resident to determine the best re-use or disposal strategy for topsoil that is not acceptable.

615.03 Non-Soil Materials

The Contractor shall place Erosion Control Blanket at slopes of 2:1 or greater as shown on the Plans. All work shall be in compliance with MaineDOT Standard Specification Section 613 Erosion Control Blanket. Soils to be protected with Erosion Control Blanket shall be compressed to the specified compaction ranges and checked for compaction level prior to installing Erosion Control Blanket.

Flat Panel planting underdrain flat panel pipe shall be 12" ADS AdvanEdge Pipe, fabric wrapped, slim-line panel drainpipe, manufactured by ADS Company, Columbus, OH 43221, or approved equal. Pipe shall be the manufacturer's standard perforated configuration. Jointing shall be made using manufacturer's standard snap coupling type fittings. Filter fabric shall be Mirafi 140N or an approved equivalent.

615.04 Sampling and Testing

The Contractor is solely responsible for quality control of the Work. For off-site or on-site manufactured soil blends, samples of individual components in addition to the blended soil mixes shall be submitted by the Contractor for testing and analysis to an approved testing laboratory. No base component material or soil mixes shall be incorporated until certified test reports by an approved testing laboratory have been received and approved by the Resident or Soil Scientist. As necessary, make all soil mix amendments as directed, and resubmit test reports indicating

amendments until approved. The Resident or Soil Scientist may request additional testing by Contractor for confirmation of mix quality and/or soil mix amendments at any time until completion. Changes in mix ratios may be required. Recommended soil testing agencies are provided herein, but alternate qualified laboratories are acceptable upon review by the Resident or Soil Scientist.

Submit documentation identifying the source of each soil component and the company responsible for mixing the planting soil mixes. The Resident or Soil Scientist shall have the right to reject any soil supplier or mixing facility. Unless authorized otherwise, the soil mix supplier shall have a minimum of five years' experience at supplying custom-planting soil mixes. The Contractor shall submit the supplier's name, address, telephone and fax numbers, and contact name. The Contractor shall submit certification that the accepted supplier/mixer is able to provide sufficient quantities and qualities of materials for the entire project. Final approval of soil supplier/mixer shall be made after an on-site review of supplier's and mixer's facility(ies) by the Resident or Soil Scientist.

All testing of the soil mix components shall be carried out by the Soils Testing Laboratory. Recommendations for amending and/or correcting the soil mix will be provided to the Contractor by the Soil Scientist. Failure of any material by testing and/or amendment procedure to meet Specification requirements shall require the Contractor to seek an alternate source for the failed material. The new replacement material shall follow all testing procedures.

The Contractor shall be responsible for recognizing that these critical project materials warrant timely and serious attention, that the testing process to achieve approved materials should be considered a lead time item, and that under no circumstance shall failure to comply with all specification requirements be considered an excusable or compensable delay.

The following are acceptable testing agencies for the various components and blends:

a. University of Maine Soil Testing Service
   5722 Deering Hall, Orono, Maine 04469-5722
   telephone: (207) 581-2945 or (207) 581-2917
   https://umaine.edu/soiltestinglab/

b. Woods End Research Laboratory,
   150 Whitten Road, Augusta, ME 04330
   telephone: (207) 293-2457, fax: (201) 293-2488

c. University of Massachusetts,
   203 Paige Laboratory, 161 Holdsworth Way, Amherst, MA 01003
   telephone: (413) 545-2311, fax: (413) 545-1931
   https://www.umass.edu/agriculture-food-environment/services/

Alternate Laboratories, STA Certified by the US Composting Council, can be found at: www.compostingcouncil.org/page/CertifiedLabs

Hydraulic Conductivity tests may be performed on samples at the Soil Supplier's facility.

The Contractor shall submit soil samples in two phases.

Phase One: Submit samples of base components for approval.

Phase Two: Upon written approval from the Resident, the Contractor shall submit the specified planting soils for approval.

Note: All testing reports shall be from less than 90 days old analyses and represent materials that area readily available for delivery to the site.

Phase one submittals of planting soils base components:

a. Imported off-site Base Loam: sample of 1 gallon.
b. Organic Amendment Materials (Compost): sample of 1 gallon.
c. Medium to Coarse Sand for Soil Blends and Drainage Layer: sample of 1 gallon.
d. Stripped and stockpiled existing soils (if proposed for reuse)

Phase two submittals of each planting soils blended mixes:

a. Planting Bed Soil: sample of 1 gallon.
b. Horticultural Subsoil: sample of 1 gallon.
c. Lawn Soil: sample of 1 gallon.

Following the initial acceptance of the specified planting soils, sampling shall be conducted for each 200 cubic yards of soil prepared for the project site. After three consecutive 200 cubic yard compliant tests, the testing quantity threshold may be increased to 500 cubic yards of soil material.

Sampling shall be done by the Contractor. The size of the samples and method of sampling shall be as follows: Samples shall be representative of the material to be brought to the site. Each sample shall be a Composite Sample, which consists of five (5) separate sub samples taken from a minimum of five (5) different locations at each source and mixed together to make the test sample.

The Contractor shall schedule this testing in order to permit reasonable time for testing, evaluation, and approvals prior to scheduled installation. Allow for a minimum of four (4) weeks to perform testing and obtain approvals.

In-place testing shall include compaction tests of each type of material (soil layers) placed, and infiltration tests.

Density Tests: ASTM D1556 Density of soil and rock in place using "Sand Cone Method" or ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) after conducting ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. (Standard Proctor).

In-place density tests shall be carried out at a rate of one test per each plant bed or lawn area and shall meet the requirements specified herein. Each eight inch lift of SBSS shall be tested for Field Density by ASTM Methods at a minimum of every 500 square feet. The Soil Scientist may also review in place density in lieu of above methods.

As required, in-place infiltration tests shall be performed using Turf-Tec IN2-W Infiltrometer utilizing manufacturer's operating instructions, or by the perforated canister methods.

In-place planting soil blends may be sampled and tested by the Resident or Soil Scientist for compliance with gradation and organic matter content as specified herein. Non-compliant materials shall be removed from the site or amended as specified by the Soil Scientist.

Refer to the "Planting Soil Testing Protocol", located in the Appendix of this Specification.

615.041 Test Reporting

The Contractor shall submit test results to the Resident in accordance with MaineDOT Standard Specifications Section 106 Quality.

Mechanical gradation (sieve analysis) shall be performed for sand, silt, and clay content and compared to the USDA Soil Classification System using sieve size numbers: 10, 18, 35, 60, 140 and 270. The silt and clay (0.002 mm) content shall be determined by a Hydrometer Test (ASTM D-422-63 (obsolete), ASTM D6913 and ASTM D7928) of soil passing the #270 sieve.

Chemical analysis shall be undertaken for Phosphorus, Potassium, Calcium, Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, organic matter content, acidity (pH) and buffer pH.

Tests shall be conducted in accordance with Recommended Soil Testing Procedures for the Northeastern United States, 2nd Edition, Northeastern Regional Publication No. 493, Agricultural Experiment Stations of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and West Virginia. Tests include the following:

a. Test for soil Organic Matter by loss of weight on ignition, as described in Northeastern Regional Publication No. 493.
b. Test for soil CEC by exchangeable acidity method as described in Northeastern Regional Publication No. 493.
c. Test for soil Soluble Salts shall be by the 1:2 (v:v) soil:water Extract Method as described in Northeastern Regional Publication No. 493.
d. Test for Buffer pH by the SMP method as described in Northeastern Regional Publication No. 493.
e. Tests for pH shall be conducted on a 1:1 soil to distilled water ratio.

Certified reports on analyses from producers of composted organic materials shall be required and new test reports shall be submitted when compost sources are changed.

615.05 Mock-Up and Inspection

At the beginning of site work, the Contractor shall demonstrate, in the presence of the Resident or Soil Scientist, subgrade preparations, including de-compaction and re-compaction methods and placement of sand blanket and drain lines that achieve the requirements of this Section. All subsequent subgrade preparations shall be in accordance with approved methods.

The Contractor shall demonstrate, in the presence of the Resident or Soil Scientist, methods and equipment for blending stripped and stockpiled topsoil (Base Loam A) with sand and organic matter, as well as storage and stockpiling to create soil blends meeting specification parameters.

The Contractor shall not place Planting Soils, Lawn Soils, or Sand Based Structural Soil on prepared subgrade or drainage layer prior to inspection and approval of Resident or Soil Scientist for compliance with depth, compaction and percolation rate. The Contractor shall request inspection before proceeding at least ten working days prior to placement of soils.

The Contractor shall not place any plant material prior to inspection and approval of Resident or Soil Scientist for compliance with soil depth and compaction specifications. The Contractor shall request inspection before proceeding at least ten working days prior to placement of soils.

Upon acceptance of all materials and prior to installing Lawn Soil, the Contractor shall construct a mock-up on site of Lawn Soil in a bed to allow the Resident to review the installation methods. Approved materials required include drainage layer (if required), and Lawn Soil as specified. Moisture content of all soils must be compliant with this section. The Mock-Up may be part of the permanent installation if the Resident or Soil Scientist approve it.

Upon acceptance of all materials and prior to installing the planting bed profile, the Contractor shall construct an on-site mock-up of a tree planting profile in a bed to allow the Resident to review the installation methods. Approved materials required include drainage layer (if required), Horticultural Subsoil, and Planting Bed Soil as specified. Moisture content of all soils must be compliant with this section. The Mock-Up may be part of the permanent installation if the Resident or Soil Scientist approve it.

615.06 Contractor Qualifications

The installer shall have a minimum of five (5) years' successful experience, equivalent to the required scope of work, including the preparation, mixing and installation of custom Planting Soil and planting mixes in urban locations.

Soil work shall be performed by a firm that has sufficient earthwork machinery at the job site simultaneously to amply provide for the vigorous execution of the site work without interruption or delay. Machinery operators shall be well experienced in this type of work.

615.07 Delivery, Storage, and Handling

Material shall not be handled, hauled, placed, or compacted during early spring, if they are frozen, or when they are wet from heavy rainfall. The Contractor shall not move, blend or grade soil when moisture content is so great that free moisture is apparent, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, or allow to dry, to bring soil moisture content to between 60% of optimum moisture content and optimum moisture content as determined by ASTM D698 prior to compaction, grading or planting.

Field Soil Moisture Test procedure is applicable for general soil moving and placement only and shall not be considered appropriate for compaction of soils. The Resident or Soil Scientist shall be consulted to determine if the soil is too wet to handle.

a. In the palm of one's hand Form soil into a ball if soil retains shape and crumbles upon touching, the soil may be worked.
b. If the soil will not retain its shape, the soil is too dry and should not be worked.
c. If the soil retains shape and will not crumble, the soil is too wet and should not be worked.
d. If the soil glistens or free water is observed when the sample is patted in the palm of one's hand the soil is too wet and should not be worked.

Store and handle packaged materials in strict compliance with manufacturer's instructions and recommendations. Protect all materials from weather, damage, injury, and theft.

Sequence deliveries to avoid delays. On-site storage space is permissible only with written notice from the Resident. Deliver materials only after preparations for placement of planting soil have been completed.

Prohibit vehicular and pedestrian traffic on or around stockpiled planting soil.

Planting Soil that is to be stockpiled longer than two weeks, whether on or off site, shall not be placed in mounds greater than six feet high. Windrows are the preferred stockpiling method.

Vehicular access to the site is restricted. Before any landscaping work, the Contractor shall submit for approval a plan showing proposed routing for deliveries and site access.

615.08 Pre-Installation Examination and Preparation

At least 10 working days prior to the start of any landscaping work, the Contractor shall request a landscape construction kickoff meeting with the Resident, the owner's representative, the landscape architect, the soil scientist and any other parties involved with landscape construction. The Contractor shall demonstrate familiarity with this Special Provision Section 615 Planting Soils, and other relevant sections of the construction documents. The Contractor shall develop a soil plan that articulates the means and methods of soil blending, subgrade preparation, soil placement, installation of panel drains, and other steps outlined in the Specification. A follow-up meeting shall be conducted at the beginning of landscape preparation.

Prior to the beginning of landscaping work, the Contractor shall examine the site and coordinate work to ensure there are no deficiencies or conditions detrimental to the proper completion of this work. Any unexpected differing site conditions shall be noted and related to the Resident.

The Contractor shall coordinate activities so that there is no soil disturbance from traffic or other construction activities subsequent to placement of any landscaping materials. The Contractor shall not place any planting soil until all work in adjacent areas is complete and approved by the Resident. The Contractor shall confirm there are no subgrade deficiencies, including but not limited to:

a. Construction debris present within the planting area
b. The subgrade is at incorrect depths for installing the designed soil profile and drainage layer. A subgrade elevation survey is required.
c. Incomplete irrigation and/or subsurface drainage installation.
d. Incomplete lighting and exterior electrical installation.
e. Conflict with underground utilities.
f. Subgrade contaminated with oils, compressible material, silt or clay
g. Subgrade must infiltrate water at the rate of at least one inch per hour.

All subgrade areas to be filled with Sand and Gravel, or Planting Soils shall be free of construction debris, refuse, vegetation, compressible or decayable materials, all stones greater than 6 inches, concrete washout or soil crusting films of silt or clay that reduces or stops drainage from the Planting Soils into the subsoil; and/or standing water. Such material shall be removed from the site prior to placement of subgrade or planting soils and plants in the planting areas.

The Contractor shall confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope parallel to the finished grade and/or toward the subsurface drain lines as shown on the Drawings. The subgrade must slope at a minimum of two percent towards the bottom of slopes and panel drains Subgrade levels shall be adjusted as required to ensure that all planting and lawn areas have adequate drainage

The Contractor shall submit a survey of the final subgrade in all areas where planting soils will be placed for approval by the Resident. Placement of any drainage layer or planting soil shall not precede acceptance by the Resident.

The Contractor shall examine soil and remove foreign materials, stones and organic debris over 1/2" in size. Remove all vegetation from stockpiles prior to blending. Mix-in fertilizers and amendments as required by tests and as approved by the Resident or Soil Scientist. All preparation and mixing shall be accomplished when the soil moisture content is compliant with this Special Provision Section 615 Planting Soils and at a moisture content approved by the Resident or Soil Scientist. If lime is to be added, it shall be mixed with dry soil before fertilizer is added and mixed.

615.09 Excavation and Removal

The Contractor shall carefully delineate the limits of work and excavation and remove the materials to the elevations shown on the plans to accommodate the new soil profile. The Contractor shall maintain at the site, sufficient surveying equipment to accurately excavate to the required subgrade and install soil to the required finish grade. The Contractor shall be responsible to install soil profiles at the elevations and thickness shown on the Plans. The Contractor shall maintain established bounds and benchmarks and replace them, if any are destroyed or disturbed.

615.10 Mixing of Planting Soil Mixes

Soil blends shall be produced with equipment that blends components together in a thorough and uniform manner. This may be accomplished by a minimum of three handling events on a hard surfaced area with earth moving equipment or by alternately passing soil components through a screener. Base components and Soil Mix stockpiles should be protected from wind and rain and shall not be permitted to be stored in standing water.

615.11 Subgrade Preparation, Inspection, and Percolation Testing

After subgrade levels have been reached, in areas with no drainage layer, the Resident shall observe de-compaction and preparation of the subgrade according to this Section and inspect soil conditions to evaluate subsurface drainage conditions.

Coordinate the following scarification work to eliminate subgrade compaction when located in lawn and planting areas. Maintain 12" clearance from any underground utilities during subgrade de-compaction. Subgrade preparation is not required in areas with a drainage layer.

a. In heavily compacted subgrade areas such as, but not limited to, temporary parking areas, material stockpile areas, temporary roadways, construction areas and areas around structures and other similar areas, prior to establishing the final subgrade, these areas shall be dug up or ripped to a depth of 18" to break up the soil hard pan, then re-compacted with two passes of a wide track bulldozer size D-6 or smaller, or other approved equipment. Vibratory compaction of subgrade in planted areas is prohibited.
b. For all general lawn and planting areas that are not heavily compacted or would be mitigated as specified above, immediately prior to placing drainage layer or Planting Bed Soil, the entire subgrade shall be loosened to a minimum depth of 8" using the teeth of a backhoe or other suitable equipment, then re-compacted with two passes of a wide track bulldozer size D-6 or smaller, or other approved equipment. Vibratory compaction of subgrade in planted areas is prohibited.

After Subgrade has been scarified as described above, it shall be recompressed by using the tracks of a wide-tracked bulldozer, multiple passes of a skid steer loader, or the curled bucket of an excavator. Verify the subgrade passes water at or greater than the minimum requirement of one-inch per hour.

Remove all stones or debris greater than 6" in any dimension from the subgrade prior to placing Drainage Layer or Planting Bed Soils.

After the subgrade has been prepared, in areas with no drainage layer, Percolation tests shall be performed according to the following test procedures. This method may also be used to evaluate planting soils infiltration capacity, but the buckets should be placed approximately 5" into the soil for the test.

a. Percolation testing of the subgrade should be scheduled a minimum of 10 days prior to placing planting soils to allow adequate time for response by the Owner and Design Team should any areas not be free draining
b. Utilize perforated canisters or buckets seven to ten inches in diameter and a minimum of 6" high.
c. A test hole shall be hand dug at the soil horizon to be tested approximately one-inch larger than the diameter of the test canister and approximately 6" deep. The sides of the test hole shall not be smoothed.
d. Place one-half inch of clean coarse sand in the bottom of the hole and place the canister firmly into the hole. The space around the canister shall then be filled with coarse sand. Tamp the coarse sand to firmly fill any void space around the test canister.
e. Fill the canister with water to the soil horizon level and allow to drain until approximately one inch of water remains, or a minimum of one (1) hour.
f. Refill the canister to the soil horizon level. After the water level drops approximately one inch, start the test. Record time versus water level as the water level drops. The percolation rate is the length of time for the water level to drop per inch. The field scientist shall record the rate of percolation for a minimum of one hour or until the water level has dropped a minimum of 3" after the start of measurements.
g. Prepared subgrade must be capable of infiltration of at least one-inch per hour. If the subgrade fails to meet this requirement, notify the Resident or Soil Scientist. Additional Drainage provisions may be required.
h. Percolation Testing of Subgrade shall be conducted at a rate of one test per 500 square feet, one test per plant bed area, or at the direction of the Resident or Soil Scientist.

615.12 Installation of Drainage Layer

A Drainage Layer shall be required at all areas shown on the Plans and if subgrade preparations and subsequent testing indicate that the existing subgrade does not drain lawn or planted areas at a minimum rate of one-inch per hour. The Contractor shall notify the Resident or Soil Scientist at least five (5) days prior to the installation of drainage layers. The Contractor shall demonstrate the layout and installation of panel drains and drainage layer.

a. After subgrade preparation, layout panel drains as shown on the plans. Excavate subgrade to achieve a minimum slope of 3% toward drain lines. Drain lines must slope downward at a minimum of 0.5 percent, with 1 percent or greater preferred.
b. Use manufacturer snap type fittings for all drain line connections.
c. After layout and inspection of drain lines, place drainage sand layer over drain lines in areas and in thicknesses depicted on the plans.
d. In areas with no drainage blanket, drain piping must be surrounded by a minimum of 2" of sand for protection of filter fabric.
e. Notify the Resident or Soil Scientist and obtain acceptance of drainage layer prior to installation of lawn or planting soil.

615.13 Backfilling of Planting Soil Layers

Soil Placement Preparation:

a. Verify that the plumbing for the irrigation system has been installed and accepted.
b. Verify that the subgrade preparations have been reviewed and accepted, including de-compaction and removal of large stones.
c. Notify the Resident of soil placement operations at least seven (7) calendar days prior to the beginning of work.
d. Verify that the subgrade passes the minimum water infiltration requirement.
e. Do not proceed with the installation of Lawn or Planting Soil, until all utility work in the area has been installed.
f. The Contractor shall identify the locations of underground utilities prior to proceeding with soil work and shall protect all utilities from damage.
g. Do not begin Planting Soil installation until all drainage, irrigation main lines, lateral lines, subgrade preparations and irrigation risers shown on the drawings are viewed and approved by the Resident or Soil Scientist.
h. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use plywood and/or plastic sheeting as directed to cover existing asphalt, concrete, metal and masonry work. Clean up any soil or dirt spilled on any paved surface, including at the end of each working day. Any damage to the paving or architectural work shall be repaired by the Contractor at the Contractor's expense.

After the subgrade soils have been loosened, re-compressed and inspected. Lawn and Planting Soils may be spread by using a wide track bulldozer size D-5 or smaller or may be dumped and spread with the bucket of a backhoe from the edge of the loosened area. No rubber-tired equipment or heavy equipment except for a small bulldozer shall pass over the subsoils (subgrade) after they have been loosened and recompressed. If the Contractor plans to utilize such areas for any use of heavy equipment, this work should be carried out prior to beginning the process of loosening soils or filling in that area.

As possible, placement of Planting Bed Soil and plant stock shall be carried out simultaneously to prevent excessive traffic over soil lifts and to maintain the integrity of the soil layers. The Contractor shall install plants simultaneously with the installation of the lower soil

layers. The upper soil layers shall not be installed before all plants are installed and before the acceptance by the Resident or Soil Scientist.

Planting Bed Soil and Lawn Soil shall be placed in lifts not to exceed 8" in thickness and compacted to meet minimum or maximum requirements as specified below:

a. A transition zone shall be formed between the prepared subgrade and Lawn or Planting Bed Soils by placing one inch of the upper-layer soil and raking into the lower soil to a two-inch thickness.
b. Planting Bed Soil shall be compacted to between 82 and 85 percent Standard Proctor.
c. Lawn Soil shall be compacted to between 84 and 86 percent Standard Proctor.
d. Planting Bed Soils shall not be compacted with vibratory equipment.
e. Geocoir 700 erosion control mat, or an approved equal, shall be installed on lawn or planting soils in areas with slopes of 2:1 or steeper as shown on the plans. The stabilized planting soils shall be compressed as described in this specification prior to installation of the mat.

Spread planting soils on prepared subgrade in lifts not exceeding one (1) foot. Minimize travel over the subgrade by placing soil from the edge using an excavator to the extent possible. Compress to a firm condition with a minimum of two perpendicular passes of the tracks of approved small equipment or by tamping with curled bucket of an excavator or multiple passes of a weighted lawn roller.

In all cases, the soil being placed shall be in a dry to damp condition. No wet soils shall be placed. All testing of in-place density for planting materials shall be made according to ASTM D6938-10 Nuclear Methods after conducting ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

Prevention of compacted soils can be accomplished by beginning the work in corner, against walls, or the center of isolated beds, and progressing outwards towards the borders.

Planting Soils shall never be moved or worked when wet or frozen.

The Contractor shall place barricades or steel plates as required to prevent any unnecessary compaction of planting soil from vehicles, equipment, or pedestrian traffic.

After Planting Soils have been spread, they shall be carefully prepared by hand raking. Stones and debris over one inch in any direction shall be removed from the premises. Fine grade planting beds to a smooth even surface with loose uniformly fine texture. Remove ridges and fill depressions as required to meet finish grades. Limit fine grading to areas that can be planted immediately after grading. Maintain the finished surfaces at the grades shown and spread additional soil to correct settlement or erosion. Surface drainage shall be maintained. Soil shall be damp and free from frost during fine grading operations.

615.14 Protection

The Contractor shall protect landscape work and materials from damage due to landscape operations, operations by other Contractors or trespassers. Maintain protection during installation until acceptance. Treat, repair or replace damaged Planting Soil installation work immediately.

Provide all means necessary, including fences, to protect all soil areas from compaction and contamination by trash, dust, debris, and any toxic material harmful to plants or humans after placement. Any area that becomes compacted shall be de-compacted and tilled to the extent determined by the Resident and recompressed to the density ranges specified. Any uneven or settled areas shall be filled, re-graded and re-compacted to meet the requirements of this Specification. Soil that becomes contaminated shall be removed and replaced with specified soil material.

Phase the installation of the planting soil blends such that equipment does not have to travel over already installed planting soil. Use of haul roads is acceptable provided that the haul road is completely re-worked to meet the requirements of this Specification.

Apply filter fabric covering and planking or other engineering controls over soil to minimize compaction and collect dust and/or debris in any area where the Contractor must work after the installation of Planting Bed Soil.

Till compacted Planting Bed Soil and replace Planting Soil that has become contaminated as determined by the Landscape Architect. Contaminated Planting Soil shall be tilled or replaced by the Contractor at no expense to the Owner.

615.15 Clean Up

During installation, keep pavement areas clean and the work area in an orderly condition. Keep the site free of trash and debris at all times. Immediately dispose of wrappings or waste materials associated with products necessary for the completion of the work. All trash and debris shall be kept in a central collection container. No trash or debris shall be buried in backfill. areas.

Once installation is complete, remove any excess soil from pavements or embedded in fixtures. Coordinate activities so that there is no soil disturbance from traffic or other construction activities after placement. All excess planting soil mixture and materials shall be removed from the site at no additional cost to the Owner unless otherwise requested.

615.16 Post-Installation Testing

In-place density testing is required in all areas. Placed planting soils must be inspected for compaction level by the Resident or Soil Scientist, or by the following acceptable Density Test Methods: ASTM D1556 Density of soil and rock in place using Sand Cone Method, ASTM D6938-10 Nuclear Methods, or ASTM D2167-08 Rubber Balloon method, after ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

Placed Planting Soils must be capable of infiltrating water at the minimum rate provided in this Specification for each type of planting soil.

Final Acceptance shall be the day on which the project is 100% complete and accepted by the Landscape Architect and Owner, including "Punch List" items. Maintenance and Warranty work shall commence at Final Acceptance.

615.17 Method of Measurement

The Planting Bed Soil, Horticultural Subsoil, and Lawn Soil will each be measured by the cubic yard complete and accepted in place. Lateral measurements will be parallel with the slope of the ground. Depths of each substrate will be as shown on the plans or as directed by the Resident or Soil Scientist.

Free Draining Sand and Gravel will be measured by the cubic yard complete and accepted in place.

Flat Panel Drains will be measured by the linear foot along the centerline of the underdrain, installed and accepted.

615.18 Basis of Payment

The accepted quantities of Planting Bed Soil, Horticultural Subsoil, and Lawn Soil will be paid for at the contract unit price per cubic yard complete in place, which will be full compensation for acquiring and testing the base components, combining the components and testing the resulting soil blend, demonstrating the product with a mock-up, delivering, storing, and handling the soil blend, examining the existing subgrade area, excavating or filling to the required subgrade elevation, testing the existing subgrade area, installing and backfilling the soil blend, and any post installation testing. Excavation and disposal of excess material to prepare the subgrade at the appropriate elevation to obtain soil blend thicknesses as shown on the plans or as directed by the Resident, will not be paid separately but will be incidental to the planting soil items.

The accepted quantities of Free Draining Sand and Gravel will be paid for at the contract unit price per cubic yard complete in place, which will be full compensation for acquiring and testing the aggregate material, delivery and storage, installation, and compaction of the material as specified.

The accepted quantities of Flat Panel Drains will be paid for at the contract unit price per linear foot complete in place, which will be full compensation for subgrade preparation and drain layout, Panel Drains and fittings, filter fabric, and drainage sand, installed and accepted in place.

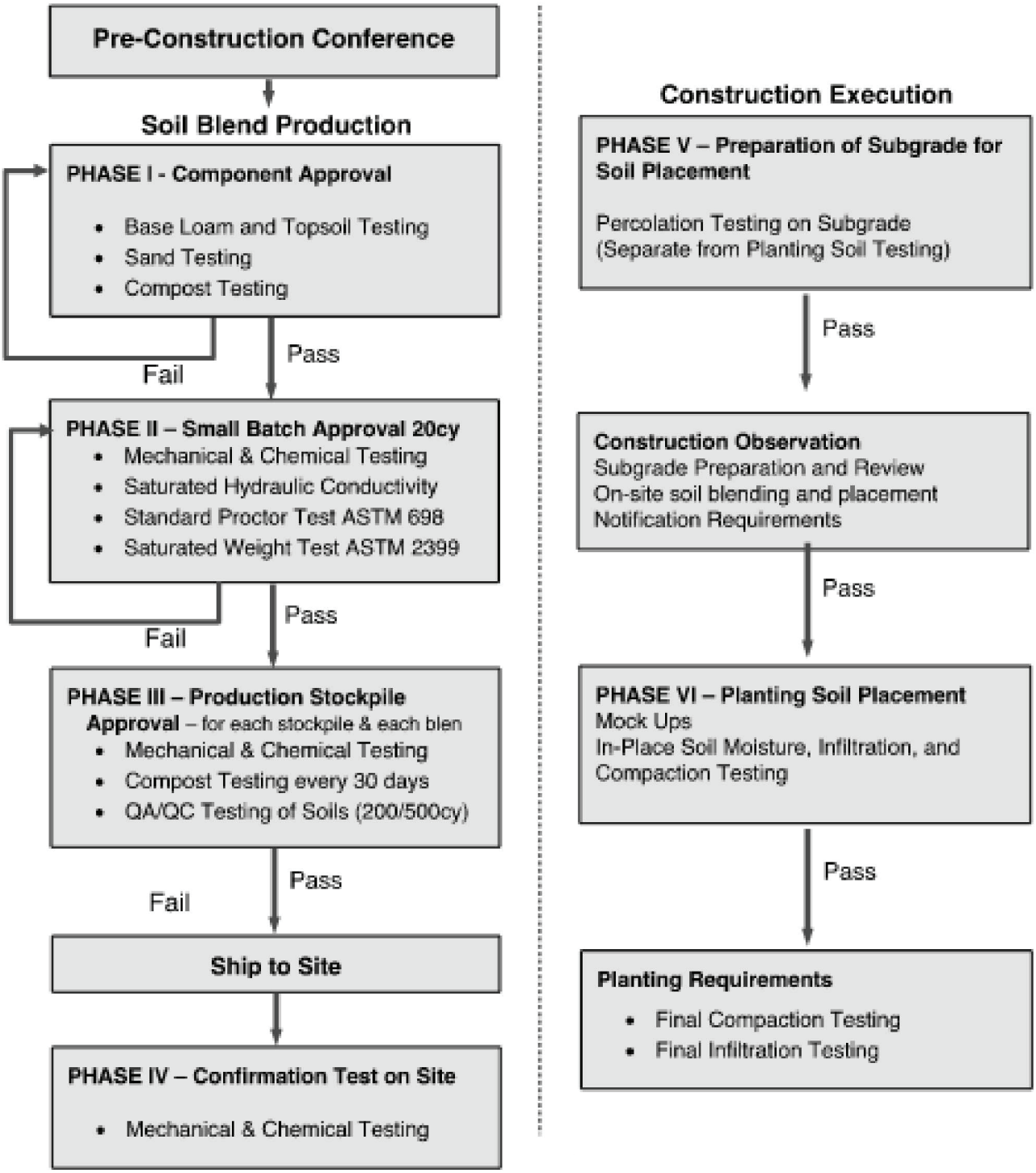
All testing and test reporting is the responsibility of the Contractor and will not be paid separately but will be considered incidental to the appropriate pay item.

Erosion Control Blanket will be paid under Item 613.319 Erosion Control Blanket.

Payment will be made under:

Pay Item		Pay Unit
615.13	Planting Bed Soil	Cubic Yard
615.14	Horticultural Subsoil	Cubic Yard
615.15	Lawn Soil	Cubic Yard
615.16	Free Draining Sand and Gravel	Cubic Yard
615.17	Flat Panel Drain	Linear Foot

APPENDIX: PLANTING SOIL TESTING PROTOCOL



SPECIAL PROVISION
SECTION 616
SODDING

Delete Section 616 Sodding from the 2020 Standard Specifications in its entirety and replace it with the following:

616.01 Description

This work shall consist of furnishing and placing approved live grass sod on a bed of friable soil for the replacement of lawns or other areas called for on the plans or authorized.

616.02 Materials

Materials shall meet the requirements in the following Sections of Division 700 - Materials:

Fertilizer	717.01(b)
Agricultural Ground Limestone	717.02

Sod shall be nursery grown on cultivated mineral agricultural soils and shall be compatible with sod growing medium specified in Special Provision 615, Planting Soils. Sod shall have been mowed regularly and carefully and otherwise maintained from planting to harvest.

Sod shall be a Certified Turfgrass Sod, superior sod grown from certified, high-quality seed of known origin, or from plantings of certified grass seedlings or stolons. It shall be inspected by the certification agency of the state in which it is grown to assure satisfactory genetic identity and purity, overall high quality, and freedom from noxious weeds as well as excessive quantities of other crops and weedy plants at time of harvest. All seed or original plant material in mixture shall be certified. Turfgrass sod shall meet the published state standards for certification.

Full Sun Mix grass sod shall be a mixture of four or five current and improved bluegrass varieties found in the top 25% of the NTEP (National Turfgrass Evaluation Proceedings), with last two tests spanning over 8 years. The mixture shall contain approximately equal proportions of each hybrid component.

Shade Mix grass sod shall be a mixture of two fescue and two bluegrass varieties, found in the top 25% of the NTEP (National Turfgrass Evaluation Proceedings), with last two tests spanning over 8 years, similar to the mix below:

Name of Seed	% by Weight in Mixture	Minimum % Purity	Minimum % Germination
Tiffany Chewings Fescue	65	95	87
Midnight Kentucky Bluegrass	20	90	87
Palmer III or Bright Star II Perennial Ryegrass	15	98	90

Sod shall be relatively free of thatch. A maximum of ½" (uncompressed) thatch will be permitted.

Sod shall be free of diseases, nematodes, and soil-borne insects. State Nursery and Plant Materials Laws require that all sod be inspected and approved for sale. The inspection and approval must be made by the State Agricultural Department, Office of the State Entomologist.

Sod shall be free of objectionable grassy and broad leaf weeds. Turfgrass sod will be considered free of such weeds if less than five such plants are found per 100 square feet of area. Turfgrass sod shall not be acceptable if it contains any of the following weeds: common bermudagrass (wiregrass), quackgrass, johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel or bromegrass.

Pegs for holding sod shall be of approved sound wood and at least ¾ inch in thickness, square or round, and a minimum of 8 inches in length or approved equal.

The soil shall be of such character that the soil will not break or crumble,

616.021 Submittals

The Contractor shall submit a planting schedule and sequence, including the coordination with the irrigation system installation, and shall indicate the proposed method of watering using a temporary irrigation system during the establishment period for areas that do not have a permanent automated irrigation.

The Contractor shall submit, prior to the expiration of required maintenance period, the recommended procedures for lawn maintenance to be implemented by the Owner throughout the calendar year.

616.03 Cutting and Transporting

Digging Sod:

- Sod shall not be dug at the nursery or approved source until sod is ready for transport to the work site or acceptable storage location.
- Before stripping, sod shall be mowed at a uniform height of 2 inches and cleared of excess clippings and other foreign matter.
- The sod shall be freshly cut with an approved sod cutter into strips of uniform thickness, and to the standard width and length as required. Sod shall be severed below the root line and shall contain a majority of the feeding roots of the grass.
- Big Roll Sod shall be 42 inches wide and normally 116 feet long, containing 405 square feet (45 square yards) of sod. Broken strips and torn and uneven ends will not be acceptable.
- Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.
- Sod shall be harvested and delivered within a 36-hour period unless a suitable preservation method is approved prior to delivery. Sod not transplanted within the 36-hour period shall be inspected and approved by the Resident prior to its installation.

Transportation of Sod:

- Sod transported in open vehicles shall be covered with tarpaulins or other suitable covers securely fastened to the body of the vehicle to prevent injury to the sod. Closed vehicles shall be adequately ventilated to prevent overheating of the sod.
- Evidence of inadequate protection of the sod after digging, carelessness while in transit, or improper handling of sod shall be cause for rejection.
- Sod shall be kept moist, fresh, and protected at all times. Such protection shall encompass the entire period during which the sod is in transit, being handled, or in temporary storage.
- Upon arrival at a temporary storage location or the site of the work, sod material shall be inspected for proper shipping procedures. Should the sod be dried out, the Resident will reject the sod. The Contractor shall remove rejected sod at once from the work area and replace it with acceptable material.
- Unless otherwise authorized, the Contractor shall notify the Resident at least two working days in advance of the anticipated delivery date of sod material. Certificate of Inspection shall accompany each sod shipment.

Handling and Storage of Sod:

- Sod material shall be handled with extreme care to avoid breaking or tearing strips.
- Sod shall not be stored for longer than 30 hours prior to installation. Sod shall be stored in a compact group and shall be kept moist. Sod shall be prevented from freezing.
- Sod that has been damaged by poor handling or improper storage will be rejected by the Resident.

616.04 Site Preparation

The Contractor shall prepare the subsurface and topsoil surface in accordance with the requirements of Special Provision 615 Planting Soils.

Weed control for stockpiled topsoil shall be a non-selective weed killer for control of grassy and broadleaf weeds; weed control shall have short residual, allowing sodding operations to occur within 7 days of application.

Planting Soil shall not be spread until it is possible to follow immediately or within 24 hours with sodding operations. If planting soil is spread prior to this time, it shall be cultivated to loosen soil prior to sodding.

The Contractor shall set grade lines for Resident's review and approval. The final surface of topsoil immediately before sodding shall be within ½" of the required elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Stones, roots, and other debris greater than 1 inch in any dimension, which are visible at the surface of the sodding area, shall be removed and the resulting holes filled with topsoil, leaving a uniform planar surface.

The Contractor shall finish-grade the surface with a drag or rake, round out all breaks in the grade, smooth down all lumps and ridges, and fill in all holes and crevices. Rolling with a light roller is acceptable, if the surface is scarified afterward.

Compaction of topsoil for finish grade shall be 85% to 88%.

In the event of settlement, the Contractor shall readjust the work to required finished grade.

616.05 Laying Sod

Planting season shall be in the spring between the dates of March 15th and May 15th and in the fall between the dates of August 15th and October 15th. These seasons may be extended with written permission from the Resident.

Planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice. Sod shall be moist when laid and shall be placed on moist soil.

Edges of the sodded areas shall be smooth, and all sodded areas shall conform to the design cross sections and grade. At edges adjacent to curbs, paved areas, etc., the top surface of earth in sod shall be ½" below the adjacent hard surface.

Sod shall be placed and all sodding operations completed within 72 hours following stripping of sod from sod source bed.

On slopes steeper than 2:1, sod shall be fastened in place with suitable wood pins, staples or other approved methods. Pins shall be spaced at not less than 1 pin per square foot and driven flush with the surface of the sod. On slopes, sod shall be laid at right angles to the slope beginning at the bottom of the slope.

The surface of completed sodded area shall be smooth. Sod shall be laid edge-to-edge, with tight-butted, staggered joints. Any unavoidable gaps shall be filled with sod plugs or loam.

Sod shall be carefully placed to ensure that it is neither stretched nor overlapped. Immediately after laying, sod shall be pressed firmly into contact with the sod bed by tamping or rolling, to ensure tight joints, a smooth surface and the elimination of air pockets. Following compaction, topsoil shall be used to fill all cracks, and excess soil shall be worked into the grass with rakes or other suitable equipment. Sod shall not be smothered with excess fill soil.

Immediately after sodding operations have been completed, the entire surface shall be compacted with a cultipacker roller or other approved equipment weighing 100 to 160 lb./ft. of roller.

Completed sod shall be immediately watered sufficiently to uniformly wet the soil to at least 1 inch below the bottom of sod bed.

The Resident will inspect all work for Substantial Completion upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection. Acceptance of material by the Resident will be for general conformance to specified requirements, and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents. Acceptance will be upon completion and reinspection of all repairs or renewals necessary in the judgement of the Resident.

Sod areas will be considered acceptable when in compliance with all the following conditions:

- Roots are thoroughly knit to the soil;
- Absence of visible joints;
- All areas show a uniform stand of specified grass in healthy condition;
- At least 60 days have elapsed since the completion of work under this Section.

616.051 Sod Maintenance

Except as otherwise specified below, maintenance shall include all operations required to produce an established lawn, including but not limited to: Fertilizing, Mowing, Replanting, Watering, and Weeding.

Maintenance of sodded areas shall begin upon completion of sodding and shall continue for 45 days thereafter, unless sodding is not completed until after September 15th, in which case maintenance shall continue until the June 15th following.

Watering

- Week No. 1: Provide all watering necessary for rooting of sod. Soil on sod pads shall be kept moist at all times. Perform watering daily or as necessary to maintain moist soil to a depth of 4 inches. Watering shall be done during the heat of the day to prevent wilting.
- Week No. 2 and Subsequent Weeks: Water as necessary to maintain adequate moisture in the upper 4 inches of soil to promote deep root growth.

Mowing

- Mowing shall not be attempted until the sod is firmly rooted and securely in place. Not more than 40% of the grass leaf shall be removed during the first or subsequent mowings.
- Bluegrass and other cool season grasses shall be maintained between 1 ½" and 2 ½".
- All clippings shall be removed.
- After 2 mowings, the Contractor shall top dress the sod with an application of fertilizer at the rate of 1 pound of actual nitrogen per 1000 square feet.

If lawn or grass is established in the fall and maintenance is required to continue into spring months, lawn and grass shall receive an application of lime and fertilizer in the spring. Lime and fertilizer shall be spread in a uniform layer over the entire lawn surface, at the following rates:

Material	Application Rate
Lime	100 lb. / 1000 sf
Fertilizer	20 lb. / 1000 sf

The Contractor shall prevent foot traffic on sodded areas until after the second cutting of lawns.

616.06 Method of Measurement

Sodding will be measured by the square yard, measured along the slope, complete in place, or as otherwise directed.

616.07 Basis of Payment

The accepted quantities of sodding will be paid for at the contract unit price per square yard completed and accepted in place, which shall include supplying and installing grass sod, fertilizer, limestone, watering and other maintenance operations.

Excavation for placing sod will not be paid for separately but will be considered incidental to the contract unit price for sodding.

Payment will be made under:

Pay Item		Pay Unit
616.08	Sodding	Square Yard

SPECIAL PROVISION
SECTION 618
SEEDING
(Temporary Seeding – Hand Overseeding)

The provisions of Section 618 of the 2020 Standard Specifications with the following additions shall apply:

618.01 Description

This work shall consist of furnishing and broadcasting, manually, overseeding to the Plug Planting Areas of Coastal Mixes 2 and 3, as directed by the Resident or an authorized representative.

618.02 Materials

A nurse crop grass species shall be used to help stabilize soil and suppress annual weeds as the herbaceous and grass plugs become established. Establishment of the plugs is expected to take two to three growing seasons.

Hand Overseeding Type A, Purple Lovegrass is designated for use in the Plug Planting Area Coastal Mix 2 as shown in the plans and as directed by the Resident or an authorized representative. Grass seed shall be 100% ***Eragrostis spectabilis*** – Purple Lovegrass.

Hand Overseeding Type B, Autumn Bentgrass is designated for use in the Plug Planting Area Coastal Mix 3 as shown in the plans and as directed by the Resident or an authorized representative. Grass seed shall be 100% ***Agrostis perennans*** - Autumn Bentgrass, a cool season grass native to the northeastern United States.

Each seed mixture will be combined with kitty litter, or other approved dilution media, to aid proper seeding distribution, at a rate of 1 pound per 1,000 square feet (1 Unit) or 43.5 pounds per acre.

618.03 Rates of Application

The seed rate for ***Eragrostis spectabilis*** – Purple Lovegrass **s**hall be to overseed at the rate of ¾ ounce per 1,000 square feet (1 Unit) or 2 pounds per acre.

The seed rate for ***Agrostis perennans*** – Autumn Bentgrass shall be to overseed at the rate of ½ pound per 1,000 square feet (1 Unit) or 22 pounds per acre.

The seed shall be installed by the hand broadcast manual method. Hydro-seeding as a seed installation method or hydro-mulch as a seed cover are prohibited. A pelletized seed cover shall be considered under advisement from the Contractor and shall follow material submittal procedures. Pelletized seed shall not contain fertilizer. Hand seeding using a rotary hand-operated spreader and an inert filler will be approved with review by the Resident or an authorized representative.

618.09 Construction Method

Following the installation of the perennial plugs and the Planting Mix Mulch in the Coastal Mix Areas 2 and 3, the Hand Overseeding shall occur. The Contractor shall hand rake and smooth the surface for Hand Seeding with a Rotary Hand seeder using a non-clumping kitty litter or other approved dilution medium to ensure even distribution of the seed. The seed bed will then be gently tamped with a hand rake, hoe, or similar tool to ensure soil contact. Immediately upon planting, the area will be thoroughly watered-in by hand or irrigation.

618.11 Method of Measurement

Temporary Seeding – Hand Overseeding Types A and B will be measured for payment by the area of seeded surface in Units of 1000 square feet along the slope of the ground.

618.12 Basis of Payment

The accepted quantities of Temporary Seeding – Hand Overseeding Types A and B will be paid for at the Contract unit price per unit, which shall be full compensation for furnishing and satisfactorily complete the spreading of the seed.

Payment will be made under:

Pay Item		Pay Unit
618.231	Temporary Seeding – Hand Overseeding Type A	Unit
618.232	Temporary Seeding – Hand Overseeding Type B	Unit

SPECIAL PROVISION
SECTION 619
MULCH
(Special Mulch - Planting Mix and Leaf Litter)

The provisions of Section 619 of the 2020 Standard Specifications with the following additions shall apply:

619.01 Description

This work shall consist of furnishing and applying the designated type of Special Mulch for covering slopes and other areas as shown on the plans or as directed by the Resident or an authorized representative.

619.02 Materials

Special Mulch Planting Mix is designated for use in the Plug Planting Areas Coastal Mix 2 and 3 as shown in the plans and as directed by the Resident or an authorized representative, and shall be composed of a uniform blend the following components:

20% Loam
30% Compost
50% Fine Textured Wood Chip Mulch

Special Mulch Leaf Litter is designated for use in the Plug Planting Area Coastal Mix 1 as shown in the plans and as directed by the Resident or an authorized representative, and shall be a well-aged leaf compost, free from rot, twigs, debris, stones, or any material harmful to plant growth. Compost shall have been shredded and stockpiled no less than six months and no more than two years before use. An approved source of Leaf Litter Mulch is Mad Mic's Organics of Shirley, MA, www.madmics.com. Alternative sources may be submitted for approval.

619.03 General

All components and stockpile areas shall be weed-free and from inspected sources. All mulch material is subject to testing as deemed appropriate for nutrients and weed contamination as well as seed growth tests.

The Contractor shall submit a sample [approx. 1 gallon] of the Special Mulch, Planting Mix and Leaf Litter, for approval by the Resident or an authorized representative, at least 30 days before planting of the respective areas begins. Upon approval, the anticipated quantity of bulk material shall be manufactured and thoroughly mixed to ensure a quality product. This layer will be spread in a uniform, smooth layer 1½ - 2" thickness.

The Contractor shall install Special Mulch, both Planting Mix and Leaf Litter, upon completion of the installation of the Perennial Plugs.

619.06 Method of Measurement

Special Mulch, both Planting Mix and Leaf Litter, will be measured for payment by the cubic yard, accepted in place.

619.07 Basis of Payment

The accepted quantities of Special Mulch, both Planting Mix and Leaf Litter, will be paid for at the Contract unit price per cubic yard, which shall be full compensation for furnishing and satisfactorily completing the spreading of the mulch.

Payment will be made under:

Pay Item		Pay Unit
619.142	Special Mulch Planting Mix	Cubic Yard
619.143	Special Mulch Leaf Litter	Cubic Yard

SPECIAL PROVISION
SECTION 621
LANDSCAPING
(Plant Species Specification and Quantities List)

The following list of items provides the estimated quantities for use on this project. The scientific name of the plant is provided along with the common name.

The Contractor shall follow the MaineDOT ***Standard Specifications*** Rev. November 2020 for landscape material and installation procedures (Section 621) as well as all applicable bid documents.

* PLANTING SPEFICATIONS for this project will be supplemented as provided in the working plan set for WIN 028940.10 Roux Raise Campus Trail Project Planting sheets 37 – 42.

The Resident Engineer or Project Landscape Architect or designee will be available to inspect plant materials, supervise plant locations, and inspect planting at that time. The Contractor shall submit appropriate schedules and provide a minimum of 72 hours' notice for supervision.

Per Standard Specifications a two-year guarantee will be incidental to plantings.

All plant material shall follow the terminology of the ***American Standards for Nursery Stock*** (ASNS), from the American Nursery and Landscape Association (ANLA), latest revision.

Pay Item	Description	Unit	Quan.	Total	
	Evergreen Trees				
621.026	Evergreen Trees 4'- 5' Group A B&B	Each		2	
	Thuja standishii x. plicata - 'Green Giant'Arb. B&B		2		
621.037	Evergreen Trees 5'- 6' Group A B&B			24	
	Juniperus virginiana - Eastern Red Cedar B&B		24		
621.046	Evergreen Trees 8'- 10' Group A B&B	EA		1	
	Pinus strobus - Eastern White Pine		1		
621.047	Evergreen Trees 8'- 10' Group B B&B	EA		1	
	Picea glauca - White Spruce		1		
621.054	Evergreen Trees 10'- 12 Group C B&B	EA		4	
	Pinus rigida - Pitch Pine		4		
	Deciduous Trees				
621.121	Small Deciduous Trees 5' – 6' Group B B&B			1	
	Sorbus aucuparia - (European Mountain Ash)		1		
621.138	Small Deciduous Tree 1½"- 2" cal. Gr.A B&B	EA		7	
	Populus tremuloides - Quaking Aspen		7		

621.2021	Med. Decid. Tree 2½"- 3" cal. Group A B&B	EA		3	
	Betula allegheniensis- Yellow Birch Single Stem		3		
621.28	Large Decid. Tree 2½"- 3" cal. Group B B&B	EA		6	
	Juglans cinerea - Butternut		6		
621.281	Large Decid. Tree 2½"- 3" cal. Group C B&B	EA		3	
	Quercus ilicifolia - Scrub Oak		3		
621.285	Large Decid. Tree 3"- 3½" cal. Group A B&B	EA		5	
	*Quercus r*ubra - Red Oak		5		
621.286	Large Decid. Tree 3"- 3½" cal. Group B B&B	EA		3	
	Tilia americana - American Linden		2		
	Quercus alba - White Oak		1		
621.287	Large Decid Tree *3" - 3½"* cal. Group C B&B	EA		16	
	Platanus x acerifolia London Plane Tree		16		
621.291	Large Decid. Tree 3½" - 4" cal. Group A B&B	EA		7	
	Quercus bicolor - Swamp White Oak		7		
621.293	Large Decid. Tree 3½" - 4" cal. Group C B&B	EA		1	
	Gymnocladus dioicus - Kentucky Coffeetree		1		
	Evergreen Shrubs				
621.389	Evergreen Shrubs 15" – 18" Group A 2 Gal. Cont.	EA		129	
	Juniperus hor..'Prince of Wales- Creeping Juniper		129		
	Broadleaf Evergreen Shrubs				
621.478	Broadleaf Evergreens 6" – 12" Gr. A 1 Gal./Cont.	EA		101	
	Arctostaphylos uva-ursi - Kinnikinik/Bearberry		101		
	Deciduous Shrubs				
621.546	Decid. Shrubs 2' - 3' Group A Cont.	EA		101	
	Comptonia peregrina - Sweet Fern		77		
	Spiraea alba - White Meadowsweet		24		
621.547	Decid. Shrubs 2' - 3' Group B 2 Gal. Cont.	EA		10	
	Ilex verticillata 'Jim Dandy' - 'J.D. Winterberry		1		
	Salix purpurea - Purple Osier Willow		9		
621.548	Decid. Shrubs 2' - 3' Group C 3 Gal. Cont.	EA		43	
	Ceanothus americanus - New Jersey Tea		43		
621.552	Decid. Shrubs 3' - 4' Group A 10 Gal. Cont.	EA		42	
	Ilex glabra 'Densa' - Inkberry		42		
621.553	Decid. Shrubs 3' - 4' Group B 3 Gal. Cont.	EA		8	
	Sambucus canadensis - American Elderberry		8		

621.558	Decid.Shrubs 4'-5' Group A 10 Gal. Cont. [4'ht.min.]	EA		93	
	Myrica pensylvanica - Bayberry		93		
621.559	Decid. Shrubs 4' - 5' Gr. B 7 Gal. Cont.	EA		16	
	Ilex verticillata 'Red Sprite'- Winterberry		16		
621.56	Decid. Shrubs 4' - 5' Gr. C B&B	EA		89	
	Prunus maritima - Beach Plum		89		
	Vines				
621.66	Vines 18"- 24" 1 Gal. Cont.	EA		30	
	Parthenocissus quinquefolia - Virginia Creeper		30		
	Grasses/Perennials Plugs Cont. 4" Plugs				
621.703	Plugs/Starter plants 4" DP Deep Pots/Cont.	EA		3,893	
	Ammophila brevigulata - Beach Grass		3,893		
621.7091	Herbaceous Porennials/Grasses Plugs 4" DP Deep Pots Cont. 2¼" x 4" Plugs Cont. Plants 6"min ht. Typ.	EA		17,290	
	Achillea millefolium - Common Yarrow		1,090		
	Angelica lucida - Seacoast Angelica		244		
	Asclepias tuberosa Butterfly Milkweed		352		
	Deschampsia ces-pitosa - Tufted Hair Grass		633		
	Eragrostis spectabilis - Purple Love Grass		3,814		
	Monarda fistulosa- Bergamot		184		
	Panicum virgatum - Switch Grass		862		
	Schizchyrium - Little Bluestem		1,643		
	Solidago caesia - Wreath Goldenrod		1,383		
	Solidago sempervirens - Seaside Goldenrod		578		
	Symphyotrichum ericoides - Heath Aster		544		
	Symphyotrichum laeave - Smooth Aster		184		
	Symphyotrichum oblongifolium - Fall Aster		690		
	Symhyotrichum undulatum - Wavy Aster		352		
	Waldsteinia fragarioides - Barren Strawberry		4,737		
	Periannials/Grasses 1 Gallon Containers				
621.71	Herbaceous Perennials/Grasses 1 Gal. Cont Group A	EA		195	
	Bouteloua curtipendula - Side Oats Grama		195		
621.711	Herbaceous Perennials 1 Gal. Cont Group B	EA		88	
	Ageratina altissima - White Snakeroot		58		
	Thalictrum pubescens - King of the Meadow		30		
621.712	Herbaceous Perennials 1 Gal. Cont. Group C	EA		735	
	Iris hookeri - Beach-head Iris		271		
	Iris versicolor - Blue Flag Iris		464		

SPECIAL PROVISION
SECTION 621
LANDSCAPING
(Metal Landscape Edging)

The provisions of Section 621 of the 2020 Standard Specifications with the following additions shall apply:

621.01 Description

This work shall consist of furnishing and installing metal edging required for paving and landscape edges as indicated in the Drawings. Include, but do not limit to:

- Flat vertical steel edging
- "L" shaped angle aluminum edging

621.02 Materials

All products and materials shall be of new stock, free from defects, and of the best commercial quality for each intended purpose.

Steel Plates, Shapes and Bars shall conform to ASTM A36.

Aluminum shall be 6061-T6 ally and temper as defined in ASTM E34, conforming to B308 as applicable.

621.021 Materials – Flat Steel Edging

Steel edging shall be Border Concepts Edging, "Border King" manufactured by Border Concepts, Inc., or approved equal. Steel edging shall be shop fabricated, ¼" x 5" deep, primed and painted black. Unless authorized otherwise, edging shall be furnished in 16-foot lengths.

Border Concepts, Inc.
P.O. Box 471185, Charlotte, NC 28247

Steel edging shall have slotted holes for staking steel edging every 30" on center.

Steel stakes shall be 15" long, tapered.

The manufacturer's end stakes and splicer units shall be used.

The manufacturer's standard touch-up paint for in-field touch-up of scratched or marred areas shall be utilized.

621.022 Materials – Aluminum Edging

Aluminum Edging shall be Permaloc StructurEdge, with 3/16" thick exposed top lip x 1-5/8 in. high x 8 feet long, extruded aluminum alloy 6005, with T-5 hardness, manufactured by Permaloc Corporation, or approved equal.

Permaloc Corporation
Holland, MI 49424
Telephone: (800) 356-9660, or (616) 399-9600

The horizontal base shall have an upward facing angle profile designed to integrate restraint of brick and paver surfaces for straight-line and curvilinear applications. Each section shall have holes in its base spaced 4" apart along its length to receive anchors.

The section ends shall splice together with horizontal 4" long aluminum sliding connectors, 1/16" thick x 1" wide (or ½" wide for 1-inch-high edging).

Anchors shall be one of the following, or approved equal:

- 3/16-inch x 1-1/2 inches or longer Ardox concrete nail,
- Drive pin fastener equal to Hilti DX 40 powder actuated pin
- Ramset Trakfast Automatic Fastening System pin

621.031 Submittals

The Contractor shall provide shop drawings for fabrication, installation and erection of all parts of the work. Provide plans, elevations and details of anchorages, connections and accessory items. Show all interfaces and relationships to work of other trades. Shop drawings shall be submitted in accordance with Section 105.7 Working Drawings.

621.032 Construction

The Contractor shall perform cutting, drilling, and fitting required to install metal edging to the location, alignment and elevation provided in the Drawings. Material shall be backfilled on each side of the edge as specified for the adjacent surface and shall be thoroughly compacted by means acceptable to the Resident. Extreme care shall be taken not to destroy alignment. Any damage caused to the metal edging alignment shall be repaired at the Contractor's expense.

Steel edging shall be securely staked in its required position. Stakes shall be driven every 30" on center, along length of edging. Adjacent lengths of edging shall be spliced together with manufacturer's standard splicer unit. Edging shall be set plumb and vertical at required line and grade. Straight sections shall not be wavy; curved sections shall be smooth and shall have no kinks or sharp bends.

Aluminum edging over a bituminous concrete base shall be installed with the base of the edging resting on a compacted level base and facing towards and under the cobbles. Anchors shall be 3/8" x 10" bright spiral steel spikes and shall be driven through edging holes in the base section of the edging at each end, and at a minimum of 12" on center. With authorization from the Resident, in circumstances with harder asphalt, the Contractor may be allowed to use as anchors 1½" to 2½" powder actuated nails driven through the aluminum base at each end of the base restraint edging and 12" on center. Securely connect sections in accordance with the manufacturer's instructions. Provide additional anchors at closer spacing as necessary to firmly secure edging for permanent intended use.

Aluminum edging over concrete base shall be installed with the base of the edging resting on a level base and facing towards and under the pavers. Anchors shall be ¾" to 1" powder actuated nails driven through the aluminum base at each end of the base restraint edging and 4" to 12" on center. No anchors shall be driven within 2.5" of the edge of the concrete. Securely connect sections in accordance with the manufacturer's instructions. Provide additional anchors at closer spacing as necessary to firmly secure edging for permanent intended use.

621.37 Method of Measurement

Metal Landscape Edging will be measured for payment by the linear foot of edging installed and accepted.

621.38 Basis of Payment

Metal Landscape Edging will be paid for at the Contract unit price per foot, complete and accepted in place, which price shall include full compensation for all material, anchorage, labor, and incidental costs required to complete the work.

Payment will be made under:

Pay Item		Pay Unit
621.981	Metal Landscape Edging – Flat Steel	Linear Foot
621.982	Metal Landscape Edging – Aluminum Paver Restraint	Linear Foot

SPECIAL PROVISION
SECTION 623
MONUMENTS
(Remove and Reset Monument)

The 2020 Standard Specifications with the following additions shall apply:

623.01 Description

This work shall consist of removing, any necessary storage and placing the monument in its same location as shown on the plans, or as directed by the Resident.

623.02 Method of Measurement

Existing monuments that are removed and reset will be measured as one unit each, complete in place and accepted.

623.03 Basis of Payment

The accepted quantity of Remove and Reset Monument will be paid for at the contract unit price per each, which payment will be full compensation for all labor, materials, equipment, and incidentals necessary to complete the work, including removal, temporary storage, and placement in the location as shown on the plans or as Directed by the Resident. Any damage to the monument that occurs during construction will be repaired to the satisfaction of the Resident at no additional cost.

Payment will be made under:

Pay Item	Pay Unit
623.09 Remove and Reset Monument	Each

Highway Lighting Quality Control Checklist

Subsection 634.09 Field Testing

Project Pin # _____

Location (if multiple services, please be specific)- _____

Grounding Electrode Resistance at service _____

Number of Circuits _____

Hand-Off-Auto Switch? _____

Circuit #1

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

Circuit #2

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

I, _____, certify that this work was done in accordance with subsection 643.14 and current NEC _____ guidelines, and when tested, was functioning as intended.

(YEAR)

Electrician's Signature _____

Electrician's License # _____

Highway Lighting Quality Control Checklist

Subsection 634.09 Field Testing

Project Pin # _____

Location (if multiple services, please be specific)- _____

Grounding Electrode Resistance at service _____

Number of Circuits _____

Hand-Off-Auto Switch? _____

Circuit #3

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

Circuit #4

Open Circuit Resistance- (Ohm out both hot legs at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Megger Test- (Meg out both hot legs to ground at the cabinet while they are shorted together at the last pole and the fuse holders are disconnected at each pole) _____

Current draw- (during normal operation) Leg #1 _____ Leg #2 _____

Operating Voltage at last pole _____

I, _____, certify that this work was done in accordance with subsection 643.14 and current NEC _____ guidelines, and when tested, was functioning as intended.

(YEAR)

Electrician's Signature _____

Electrician's License # _____

SPECIAL PROVISION
SECTION 634
HIGHWAY LIGHTING
(Ornamental Lighting)
(Luminaires - LED)

The provisions of Section 634 of the 2020 Standard Specifications with the following additions shall apply:

634.01 Description

This work shall consist of furnishing and installing highway and ornamental lighting as depicted in Contract Drawings and as described in the lighting specifications included within those Drawings.

634.02 General

As directed by the Resident, Light Standards may be placed onto existing foundations installed by others. The Contractor shall coordinate with the Resident, through the manufacturer's shop drawing submittal process, to ensure a correct fit onto the existing foundations. Conduit connecting the foundations will be installed by others. The Contractor shall furnish and install all necessary wiring for the LED Luminaire connections.

634.093 Basis of Payment

This section shall be amended with the addition of the following:

Payment will be made under:

Pay Item		Pay Unit
634.041	Luminaire (Wall Mounted)	EA
634.2042	LED Luminaires E01A	EA
634.2042	LED Luminaires E01C	EA
634.2042	LED Luminaires E02C	EA
634.2042	LED Luminaires E02D	EA
634.2042	LED Luminaires Guideway Series	EA
634.70	Ornamental Lighting - Landscape Floodlight	EA
634.70	Ornamental Lighting - Under Handrail	EA
634.702	Ornamental Lighting - LED Flexible Strip	LF

SPECIAL PROVISION
SECTION 652
MAINTENANCE OF TRAFFIC

Approaches. Approach signing shall include the following signs at a minimum. Field conditions may warrant the use of additional signs as determined by the Resident.

Road Work Next X* Miles
Road Work 500 Feet (Ahead)
End Road Work

Work Areas. At each work site, signs and channelizing devices shall be used as directed by the Resident.

Signs include:

Road Work XXXX[1].
One Lane Road Ahead
Flagger Sign

Other typical signs include:

Be Prepared to Stop
Low Shoulder
Bump
Pavement Ends

The above lists of Approach signs and Work Area signs are representative of the contract requirements. Other sign legends may be required.

Unless otherwise defined in Special Provision 105/107 or submitted and approved in the Traffic Control Plan, the following shall apply:

- The Contractor shall conduct their operations in such a manner that the roadway will not be restricted to one lane for more than 2,500 feet at each work area and no more than 4,000 feet for paving, milling, and crack seal/repair work areas.
- Where more than one work area restricts traffic to one lane operation, these work areas shall be separated by at least 1 mile of two-way operation.

Temporary Centerline A temporary centerline shall be placed each day on all new pavement to be used by traffic. The temporary centerline, when specified of reflectorized traffic paint, shall conform to the standard marking patterns used for permanent markings. Failure to apply a temporary centerline daily will result in a Traffic Control Violation and suspension of paving operations until temporary markers are applied to all previously placed pavement.

[1] "Road Work Ahead" to be used in short duration operations and "Road Work xx feet" to be used in stationary operations as directed by the Resident.

SPECIAL PROVISION
SECTION 800
WATER UTILITY ITEMS

The provisions of the 2020 Standard Specifications with the following additions shall apply:

800.01 Description

The work shall consist of replacing a 12" ductile iron watermain and service lines, installing sleeves and valves, properly abandoning the existing watermain, the installation and maintenance of a temporary watermain, and the installation of a new hydrant assembly, and associated components adjacent to the work.

800.03 General

All work shall be done in accordance with all applicable Portland Water District construction specifications for water distribution systems contained within, and Portland Water District standard water details as provided in the contract documents. Further general information can be found at PWD's website at: https://www.pwd.org/document-library/

800.04 Method of Measurement

All items will be measured for payment, complete and accepted, by the corresponding pay unit provided below.

800.05 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
802.10	12" DUCTILE IRON WATERMAIN	LF
802.168	12" MJ SOLID SLEEVE	EA
823.31	12" GATE VALVE	EA
823.3104	12" INSERTION VALVE	EA
824.301	HYDRANT ASSEMBLY	EA
825.333	1" AIR RELEASE VALVE	EA
825.334	1" COPPER SERVICE – LONGSIDE	EA
825.335	1" COPPER SERVICE – SHORTSIDE	EA
825.4313	1 ½" COPPER SERVICE – LONGSIDE	EA
825.544	TEMPORARY WATERMAIN	LS
825.55	2" WATER SERVICE – RECONNECT	EA

SECTION 800: Work Associated With Water Main Construction



Section 01150

Site Conditions

PART 1 - GENERAL

1.01 PLANT AND EQUIPMENT

A. The Contractor shall furnish plant and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Contract.

1.02 PIPE LOCATIONS

A. Pipelines shall be located substantially as indicated on the Drawings, but the Owner reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.03 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall familiarize himself with all obstructions which he can foresee, such as existing pipes, services, conduits, ducts, sewers or any other such obstructions which might interfere with the Work, and shall make arrangements with the owners of such facilities so as to save the Owner harmless from any damages thereto caused by his operations and to make whatever arrangements might be necessary to move and restore or remove and replace these facilities. Costs associated with this Work shall be incidental to the Contract.

B. The Contractor shall be responsible for the preservation of all public and private property, and shall 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, such property shall be restored by the Contractor, at no additional cost to the Owner, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Owner.

C. The Contractor shall assume full responsibility for the protection of all trees, buildings, structures, and utilities, public or private, including poles, signs, services to buildings, buried utilities, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Costs associated with this Work shall be incidental to the Contract. Any damage resulting from the Contractor's operations shall be repaired at no additional expense to the Owner.

D. Any damage to or displacement of street or highway surfaces due to blasting or otherwise shall be either replaced satisfactorily by the Contractor or shall be paid for by him to the authority responsible for the street or highway at no additional cost to the Owner.

PART 2 – PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

-- END OF SECTION --

Section 01200

Selective Demolition

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The term "Demolition" shall include modification, removal, relocation, and/or disposal of associated items as shown on the Drawings or as specified herein, and associated repair, patching or remediation. In all surrounding areas which are not being renovated under this contract, the Contractor shall verify that electrical power, lighting, and systems have not been affected by Demolition operations. In locations where systems are affected, the Contractor shall provide all work as required to maintain proper operations of the systems at no additional cost to the Owner. Provide demolition work required to allow complete installation and construction of the project components.

B. Demolition of equipment including all associated appurtenances. Appurtenances shall include but are not limited to concrete pads, concrete base supports, support structures, electrical switchgear, conduit, wiring, instrumentation, and piping.

C. Removal and replacement of utilities, pavement, curbing, vegetation and landscaping as required to accommodate new construction.

D. Coring of holes of diameter required and at locations required to accommodate utilities and piping as necessary for new construction.

E. Repair and restoration of all substrate surfaces including floors, walls, concrete, masonry, wood, plastic, wall panels, facades, etc. Repair and restoration shall include providing a smooth finish surface to match the existing surface. Removal of all anchor bolts, painting, re-surfacing, etc. shall also be required.

PART 2 - PRODUCTS

2.01 REPAIR AND PATCHING

A. Repair and patching materials shall be selected to match the quality and look of the existing substrate.

B. Concrete patching repair materials shall be trowel grade mortar for vertical and horizontal substrate and non-sag mortar for overhead surfaces. Provide SikaTop 122/123 Plus or approved equal. Mortars shall provide high early strength to minimize process downtime and shall meet the following requirements:

1. 7,000 PSI 28 day compressive strength (ASTM C109/C109M)

2. 2,200 PSI 28 day bond strength (ASTM C882/C882M)

3. 750 PSI 28 day splitting tensile strength (ASTM C496/C496M)

PART 3 - EXECUTION

3.01 PREPARATION

A. The Contractor shall provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure(s) or element(s) to the demolished as well as adjacent facilities or work to remain.

B. The Contractor shall stop demolition operations and notify the Owner and Engineer immediately if structural conditions appear to be endangered. The Contractor shall take all precautions to support the structure until a determination is made for continuing demolition operations.

C. The Contractor shall locate, identify, stub-off and disconnect all utility services and appurtenances that are not indicated to remain in accordance with the Drawings and that specified.

3.02 PERFORMANCE

A. The Contractor shall perform selective demolition work in a systematic manner. Use such methods as required to complete the work as indicated on the Drawings or as specified in accordance with the demolition schedule and applicable regulations.

B. All items specified for removal or indicated for removal on the Drawings shall be removed completely, back to the source. All associated items and appurtenances including but not limited to conduit, boxes, wiring troughs, wiring, cables, hangers, etc. shall be completely removed.

C. The Contractor shall completely fill below grade areas and voids resulting from demolition work. Provide fill materials as shown on the Drawing or as specified.

D. The Contractor shall saw-cut asphalt and concrete paved surfaces prior to removal. The joint cut shall be neat and straight.

E. Where exposed conduit exits concrete surfaces; the Contractor shall cut the conduit flush to the concrete surfaces and seal the openings gas and liquid tight.

3.03 SUBSTRATE AND SURFACE REPAIR

A. Following demolition, the Contractor shall repair surfaces and substrates to remain. The repair shall match the surrounding area in material, quality, color and quantity.

B. For repair of poured concrete walls, floors or suspended slabs (including but not limited to concrete below equipment pads), provide a smooth and finished surface.

1. Areas to be repaired shall be mechanically prepared, clean, sound and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Remove all dirt, oil, grease and all bond-inhibiting materials from the surface. Saw cut perimeter 1/8 inch minimum depth when a neat mortar is to be applied, and 1 inch minimum depth when an extended mortar is to be applied. Prepare concrete substrate to obtain a minimum surface profile of 1/16 inch in depth with a new aggregate fractured surface. Be sure the area to be repaired is not less than 1/8 inch in depth. The substrate shall be saturated surface dry with no standing water. Mix and install in strict adherence with Manufacturer’s recommendations. Apply reinforcing steel primer in any location where it is exposed.

C. Anchor bolts, threaded rods, and other systems embedded in concrete that require demolition shall be cut flush with the substrate or wall unless otherwise noted or detailed. Provide a three stage corrosion resistant epoxy coating over the embedded surface and substrate a minimum of 6" outside the extents of the embedded surface.

D. Provide aluminum diamond plate covers for equipment penetrations and openings that remain in any floor(s) following demolition. Diamond plate covers shall be a minimum of 1/4 inch thickness with beveled edge and retaining lips to maintain its position in the floor.

E. For all open floor, wall and ceiling penetrations through buildings, floors or process tankage, fill holes with non-shrink grout unless otherwise noted. All floor holes greater than 6" shall be covered with beveled edge aluminum non-slip diamond plate with underside catches so they cannot be kicked out of place.

F. Trench Patching – Roadway

1. Place gravel sub-base and base to match the depth of existing gravel sub-base and base.

2. Bituminous Tack Coat: Apply tack coat immediately prior to placing pavement to curbing, gutters, manholes, pavement, etc. for adequate bond.

3. Provide UPM High-Performance Cold Mix asphalt repair, or equivalent product, to restore paved surface to match existing grade.

G. Trench Restoration for Non-Paved Areas

1. Provide 6" of loam and provide Seeding Method Number 2 ("Roadside Mixture") in accordance with Maine DOT specification Section 618.

3.04 SALVAGED MATERIALS

A. Where shown on the Drawings or specified as Salvage all items shall be property of the Owner. The Contractor shall deliver such items to the Owner. The Contractor shall carefully remove indicated items, clean, store, and turn over the items and appurtenances to the Owner in area(s) designated by the Engineer or Owner.

3.05 PIPE CORING

A. The Contractor shall core holes for all pipe protrusions through existing concrete structures to allow watertight installation of pipe and link seal or pipe sleeve as required or as shown on the Drawings. Coring shall be with a non-impact rotary tool with diamond core drills. Double link seals shall be installed at all pipe protrusions through concrete walls containing liquid or saturated conditions on either side. Link seal requirements shall be as follows:

1. Pressure plate: glass reinforced nylon

2. Bolt and nut: 18-8 stainless steel

3. Sealing element: EPDM rubber

3.06 DISPOSAL OF DEMOLISHED MATERIALS

A. The Contractor shall remove from the project site all debris, rubbish, and other materials resulting from demolition operations. Do not remove from the project site without prior permission by Owner or Engineer. Store all demolished materials that the Owner wishes to retain at location designated by Owner or Engineer.

B. Burning of removed materials from demolished structures shall not be permitted. The Contractor shall dispose of demolition debris in a lawful manner. Management of hazardous materials not specifically identified in this specification shall be extra work. This provision does not relieve Contractor of his responsibility to respond promptly and appropriately to indications of hazardous materials. The Contractor shall dispose of all hazardous materials in a lawful manner at no additional cost to the Owner.

C. In the event that unanticipated hazardous materials are discovered or suspected, the Contractor shall carry out suitable measures to minimize hazards and immediately report conditions to the Owner & Engineer.

-- END OF SECTION --

Section 01300

Submittals

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. For all products to be incorporated into the Work submit to the Owner for approval sufficient information in the form of shop drawings, product data and/or samples such that the Owner can determine that the product is in compliance with the Technical Specifications and Drawings.

B. Submit two (2) copies of each submittal. One (1) copy will be returned to the Contractor. Each copy shall include a cover sheet which clearly identifies the product and corresponding specification section. Each cover sheet shall bear the Contractor's stamp and signature certifying that the submittal is in full compliance with the Contract Documents or that any deviations from the Contract Documents are clearly identified on a separate sheet(s) labeled "Deviations From Contract Documents" and attached to the cover sheet.

C. The Owner shall review the submittals and indicate their status as:

1. “A” - Approved Subject to the Requirements of the Contract
2. “B” - Approved as Noted, Subject to the Requirements of the Contract
3. “C” – Revise as Noted, Resubmittal Required
4. “D” – Not Approved

D. Owner's review is only for general conformance with the design concept and general conformance with the information given in the Contract Documents. Corrections or comments made during the review do not relieve the Contractor from compliance with the requirements of the Contract Documents.

E. Re-submittals: Make re-submittals under procedures specified for submittals; identify changes made since previous submittal.

F. Contractor shall be responsible for the delays and or additional expenses that result from the Contractor's failure to submit a complete submittal and/or to identify portions of the submittal that does not conform to the specifications.

PART 2 – PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

-- END OF SECTION --

Section 01710

Site Cleanup

PART 1 - GENERAL

1.01 APPLICABILITY

A. This section applies to project cleanup activities to be conducted throughout the entire duration of the Work.

PART 2 – PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 CLEANUP DURING WORK PROGRESS

A. Proceed with construction cleanup as the Work progresses

1. Remove mud, oil, grease, soil, gravel, trash, scrap, debris, and excess materials that are unsightly or may cause accidents to persons or properties.

2. Properly store tools and materials when not in use away from trafficked areas.

B. During the progress of the work, the construction areas shall be kept clean and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damages repaired so that the public and property owners will be inconvenienced as little as possible. Cleanup shall follow directly behind the progress of the Work.

C. Contractor shall fill in all depressions and water pockets on public and private property caused by his operations; clean all drains, ditches and culverts which have been obstructed by his work; and, shall leave the site in a neat condition wherever his operations have disturbed existing conditions.

3.02 FINAL CLEANUP

A. Final cleanup (including any property restoration, replacement or restitution per the Contract) shall be completed to the satisfaction of the right-of-way grantor, or any abutters, as well as to the satisfaction of any municipal or state authority which may be involved if in public right-of-way.

-- END OF SECTION --

Section 02260

Sedimentation and Erosion Control

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials, equipment and incidentals necessary to perform all installation, maintenance, removal and area cleanup related to sediment and erosion control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to installation of silt fences, sediment traps, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, erosion control blanket, and final cleanup.

1.02 SUBMITTALS

A. Within 10 days after award of Contract, submit to the ENGINEER for approval technical product literature for all commercial products to be used for sedimentation and erosion control.

1.03 REFERENCE MANUAL

A. Except as otherwise specified herein, the material and construction shall be in accordance with the Department of Transportation "Standard Specifications for Highways and Bridges of the State of Maine" and the "Maine Erosion and Sedimentation Control Handbook for Construction, Best Management Practices" (BMP Handbook).

1.04 PERFORMANCE REQUIREMENTS

A. The CONTRACTOR shall be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into streams and wetland areas via surface runoff or underground drainage systems. Measures in addition to those shown on the drawings necessary to prevent the movement of sediment off site, control erosion or stabilize disturbed areas shall be installed, maintained, removed and cleaned up at no additional cost to the OWNER.

B. Sedimentation and erosion control measures shall conform to the requirements of the BMP Handbook.

C. Where CONTRACTOR's effort to control erosion has been demonstrated to be ineffective or potentially ineffective in the opinion of the ENGINEER, the ENGINEER may order that the erosion control plan be amended and that additional erosion control measures be constructed at no additional cost to the OWNER.

1.05 SEQUENCE OF CONSTRUCTION

A. All hay bale check dams and silt fencing shall be in place below or adjacent to construction areas before actual construction begins. These devices shall remain in place until a healthy grass cover is obtained and the site is stabilized. These temporary structures shall be inspected weekly throughout the construction phase. They shall be repaired or replaced when necessary. These devices shall be removed when the area they serve is completely stabilized.

B. Permanent re-vegetation or seeding of all disturbed areas shall occur immediately upon completion of work or, if temporary stabilization measures were used, within 7 days from the time the area was last actively worked. Temporary stabilization measures are required within two days from the time the area was last actively worked or prior to storm events.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Silt Fence

1. Steel or wood posts shall be a minimum of 5 feet in length.

2. Silt fence fabric shall be a woven, polypropylene, ultraviolet resistant material such as Mirafi 100X as manufactured by Mirafi, Inc., Charlotte, N.C. or equal.

B. Mulch material for all slopes equal to or greater than 20% shall be an erosion control blanket (ECB). The ECB shall consist of 70% long fiber hay or straw and 30% coconut fiber. The fibrous material shall be held in place by top and bottom netting sewn together. The fibrous material shall be reasonably free from noxious weeds or other undesirable material. The ECB shall be Type SC150 as manufactured by North American Green, or approved equal.

C. For slopes less than 20% and level areas, mulch material shall consist of long fiber hay or straw reasonably free from noxious weeds or other undesirable material. No material shall be used which is so wet, decayed, or compacted as to inhibit even and uniform spreading. No chopped hay, grass clippings or other short fiber material shall be used unless directed. The hay or straw shall be treated with a mulch tackifier.

D. Latex acrylic copolymer such as Soil Sealant with coalescing agent as manufactured by Soil Stabilization Co., Merced, California, or approved equivalent, shall be used as hay or straw mulch tackifier. Asphalt tackifiers are not allowed.

PART 3 - EXECUTION

3.01 MINIMIZATION OF EXPOSED SOILS

A. Minimizing the exposed soil areas on the construction site is one of the most important and reliable methods of erosion control. The CONTRACTOR must phase the work so that areas of bare soil will be minimized. Exposed areas must be treated as described herein and in the BMP Handbook.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES

A. Temporary erosion and sedimentation control measures will include silt fences, hay bale barriers, temporary seeding, temporary mulching and topsoil stockpiling.

B. Silt fence will be placed down slope of all construction areas which drain toward a stream, wetland or improved area.

C. Hay bale barriers will be used as necessary until final restoration is complete. They may also be used as check dams in drainage areas. Hay bales will be staked end to end in an excavated trench four inches deep across the area of runoff.

D. Temporary mulching will be placed on all disturbed areas within two days or prior to any storm event. Mulch anchoring will be used on areas where the slope is greater than 5% or when placed after September 15. Straw mulch shall be applied at a rate of 90 lbs. per 1000 sq. ft. All mulched areas will be inspected before and after storms. If less than 90% of the surface is covered by mulch, additional mulch shall be applied immediately. Mulching shall be installed and maintained as recommended in the BMP Handbook.

E. Topsoil shall be stockpiled on site with silt fence installed down slope of the piles. These stockpiles shall be mulched in accordance with the temporary mulching requirements.

3.03 INSTALLATION

A. Silt Fence Installation

1. Position silt fences as shown on the Drawings and as necessary to prevent off site movement of sediment produced by construction activities as directed by the ENGINEER.

2. Dig trench approximately 4 inches wide and 4 inches deep along proposed fence lines.

3. Drive stakes 8 feet on center (maximum) at back edge of trenches. Drive stakes 2 feet (minimum) into ground.

4. Attach filter fabric on stakes to bottom of trench with about 4 inches of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and secure.

5. Backfill trench with excavated material and tamp.

6. Install pre-fabricated silt fence according to manufacturer's instructions.

3.04 MAINTENANCE AND INSPECTIONS

A. Inspections

1. CONTRACTOR shall make a visual inspection of all sediment control devices daily and immediately before and after every rainstorm.

2. If such inspection reveals that additional measures are needed to prevent movement of sediment to off site areas or into streams or wetland areas, CONTRACTOR shall promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

B. Device Maintenance

1. Silt fences

a. Remove accumulated sediment once it builds up to one-half of the height of the fabric.

b. Replace damaged fabric or patch with a two foot minimum overlap.

c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.

3.05 EROSION CONTROL BLANKET

A. Install erosion control blankets in accordance with manufacturer's instructions. Properly prepare, fertilize and seed the area to be covered with permanent vegetation before the blanket is applied. Apply the blankets in the direction of water flow and staple together in accordance with manufacturer's instructions. Side overlaps shall be 2-inch minimum. The staples shall be made of wire .091-inch in diameter or greater, "U" shaped with legs 10 inches in length and a 1- inch crown. The staples shall be driven vertically into the ground at a rate of one staple per square yard according to manufacturer's staple pattern guide.

B. Bury upper and lower ends of the matting to a depth of 4 inches in a trench. Where the matting must be cut or more than one roll is required, turn down upper end of downstream roll into a slit trench to a depth of 4 inches. Overlap lower end of upstream roll 4 inches past edge of downstream roll and staple.

C. To ensure full contact with soil surface, roll matting with a roller weighing 100 pounds per foot of width perpendicular to flow direction after seeding, placing matting, and stapling. Thoroughly inspect after completion. Correct any areas where matting does not present a smooth surface in full contact with the soil below.

3.06 REMOVAL AND FINAL CLEANUP

A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Re-grade all areas disturbed during this process and stabilize.

-- END OF SECTION --

Section 02315

Earthwork for Water Main Construction

REVISION TABLE

Revision Number	Revision Date	Description
2025-01	*12/19/2025*	• *Defined that Owner shall pay for initial field-testing costs related to compaction where required.*

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes all excavation for water mains, hydrants and appurtenances, including drainage, sheeting and bracing, backfilling, disposal of surplus material, and miscellaneous grading. All work shall be done as indicated on the drawings and as herein specified.

B. Excavation for water mains shall be the width and depth as indicated on the standard details. Excavation for hydrants and appurtenances shall provide suitable room for their construction.

C. The Contractor shall furnish and place all sheeting, bracing and supports, and necessary dewatering, and shall carry out the excavation in such a manner as to eliminate all possibilities of undermining or disturbing existing pipelines, utilities, roadways, shoulders and/or structures.

D. The Contractor shall furnish, place and compact various types of bedding material and trench sand as called for in the specifications or as directed. The types and quality of bedding and backfill material are specified in this section, but its use for pipe bedding, backfill, replacement of unsuitable material excavated below trench grade, and other uses are as specified elsewhere.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bedding Material

1. Screened or crushed gravel bedding material shall be hard durable particles free from organic matter, lumps of clay and other deleterious substances. The gradation shall meet the requirements of the following table and MDOT specifications Section 703.06 Type B aggregate.

Sieve Size Designation	% By Weight
½ inch	35 - 75
¼ inch	25 – 60
No. 40	0 – 25
No. 200	0 – 5.0

2. Select backfill as specified below may be used for bedding material.

3. Bedding material shall not contain particles of rock which have any dimensions greater than 4".

B. Select Backfill

1. Suitable native material with all particles of rock which have any dimensions greater than 4" removed.

2. Sand backfill shall be hard, durable particles of granular material with 100% passing the 1/2" sieve and between 0-15% passing the #200 mesh. All percentages are by weight. Sand shall be graded so as to secure the required compaction.

C. Backfill

1. Suitable native material that does not contain stone or rock particles with any dimensions greater than 8".

2. Bank Run gravel borrow consisting of uniformly graded granular material having no rocks with a maximum dimension greater than 8" and that portion passing a 3-inch square mesh sieve shall contain no more than 70% passing 1/4-inch mesh sieve and not more than 10% passing a No. 200 mesh sieve.

PART 3 - EXECUTION

3.01 EXCAVATION

A. When any pavement, regardless of type, must be cut, it shall be done in a neat and symmetrical manner by use of a saw, chisel, or other suitable method. In no case shall pavement be torn up with a backhoe bucket except between and inside of cuts previously made as above. Should any further pavement be broken, outside of the cuts, as by blasting, such damaged pavement shall be cut out in a neat and orderly fashion.

B. The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths shown on the drawings or directed by the Engineer.

C. No extras will be allowed for quicksand excavation, muck excavation, or any other type unless specifically provided for in the bidding schedule.

D. Surplus excavated material may be used at other parts of the construction project as required for fill, etc. Excess material shall be disposed of by the Contractor.

E. The sidewalls of all trench excavation shall be kept as nearly vertical as possible in all roadways, lawns, near homes, etc. by sheeting, bracing, or other means. The width of the trench at a point six (6) inches above the top of the water pipe shall not be greater than the width detailed. If the type of excavated material will not allow the width detailed, then the trench shall be properly sheeted and braced. The cost of sheeting, bracing, or other means is included in the cost of the pipelines and no extras will be allowed.

F. The excavation shall be made to secure a flat bottom trench (undisturbed earth bottom) for the full length of the pipe so as to give a uniform support to the pipe and shall be in accordance with ANSI A21.50 (AWWA C150), Type 2 Laying Condition.

G. The bottom of the trench shall be accurately graded to provide support to the full length of the pipe barrel. Excavate at each bell to prevent bell from bearing on trench bottom.

3.02 EXCAVATION BELOW TRENCH GRADE

A. By mistake of Contractor: Where the bottom of the trench shall, by mistake of the Contractor, have been taken out to a greater depth than required, it shall be refilled to the proper grade with bedding material, and all to be placed and compacted as specified at no additional cost to the Owner.

B. By instruction from Engineer: If, in the opinion of the Engineer, existing material below trench grade is unsuitable for properly laying the pipe, the Contractor will excavate and remove the unsuitable material and replace the same with bedding material as authorized by the Engineer and properly compacted to his satisfaction. The Contractor will be paid under the item titled "Unsuitable Material Excavated Below Trench Grade."

3.03 EXCAVATION NEAR EXISTING UTILITIES, ETC

A. It will be necessary to excavate near existing pipes, drains and other utilities in certain locations. Some of these have been indicated on the drawings, but no attempt has been made to show all of the services and the completeness and accuracy of the information given is not guaranteed. The Contractor shall call "Dig-Safe" at least three business days in advance of any excavation to allow utilities to locate underground facilities.

B. As the excavation approaches pipes, conduits, or other underground structures and utilities, digging by machinery shall be discontinued and the excavation shall be done by means of hand tools.

C. If the utility is of the opinion that at any point sufficient or proper support has not been provided, they may order additional supports placed at the expense of the Contractor. Compliance with such order shall not relieve the Contractor from his responsibility for the sufficiency of such supports. It shall be the responsibility of the Contractor to prevent damage to or displacement of utilities and to consult with and request the concurrence of the utility company's representative in this matter at all locations. The cost of protecting such utilities shall be considered incidental to the cost of laying the pipe.

3.04 TRENCH SURCHARGES

A. The excavated material shall be placed adjacent to the excavation in a manner to cause no excessive surcharge on the trench bank nor to obstruct free access to hydrants and valves. Should traffic or other conditions make it impractical or unsafe to stack material adjacent to trench, it shall be hauled and stored at a location provided by the Contractor and at the expense of the Contractor. When required, it shall be re-handled and used in backfilling the trench by the Contractor and at his expense.

3.05 SHEETING AND BRACING

A. The Contractor shall be responsible for the design, construction, maintenance and safety of all sheeting and bracing required to support the sides of the excavation and to prevent the movement of earth which could in any way damage or endanger adjacent structures, utilities, roadways, increase the width of the excavation to more than that specified, or delay the work.

B. All sheeting, bracing and shoring is to be included in prices bid for several items of work in bidding schedule and will not be paid for as separate items.

C. No shoring shall be left in place unless so directed by the Engineer.

3.06 DRAINAGE AND DEWATERING OF EXCAVATIONS

A. The Contractor shall conduct his operations so as to prevent at all times the accumulation of water, ice and snow in excavations or in the vicinity of excavated areas so as to prevent water from interfering with the progress or quality of the work. Under no conditions shall water be allowed to rise in non-backfilled trenches after pipe has been placed.

B. Accumulated water, ice and snow shall be promptly removed and disposed of by dewatering. Disposal shall be carried out in a manner which will not create a hazard to public health; nor cause injury to public or private property, work completed or in progress, or public streets; nor cause any interference in the use of streets and roads by the public. Pipes under construction shall not be used for drainage of excavations.

C. During construction, when an unstable condition in the pipe sub-grade has been created due to the Contractor's excavation, the sub-grade shall be stabilized by dewatering or other means accepted by the Engineer.

3.07 BACKFILLING – GENERAL

A. In general, and unless other material is indicated on the drawings or is specified, material used for backfilling trenches and excavations around structures shall be suitable material which was removed in the course of making the construction excavations or as specified.

B. Frozen materials shall not be placed in the backfill, nor shall material be placed upon frozen material. Previous frozen material shall be removed or shall be otherwise treated as required before new backfill is placed.

C. Backfilling shall be done as soon as practical after the pipe has been laid and jointed.

3.08 SUITABLE BACKFILL MATERIAL

A. Suitable backfill material shall be the following or a combination of the following:

1. Excavated material that will compact to the compaction requirements.

2. Material that does not contain rocks larger than 8" in any dimension.

3. Dry clay material free from lumps.

4. Wet clay that alone would pump but when mixed with sand and/or gravel will be stable and will compact.

3.09 BACKFILLING PIPE TRENCHES

A. As soon as practicable after the pipes have been laid and jointed, backfilling shall begin and shall proceed until it is completed or has sufficient backfill to allow pipe testing.

1. The first layer of suitable backfill material shall be brought half-way up the pipe and compacted to 80% maximum density and then the normal backfilling shall begin and shall be compacted as specified.

2. All backfill shall be thoroughly compacted by hand tamping as placed, by use of mechanical or vibratory compactors, or by other acceptable methods.

3. Remainder of the trench shall be backfilled as follows:

a. In paved areas, road shoulders and seeded areas, the entire depth of trenches above the center line of the pipe shall be backfilled in eight (8) inch layers with suitable backfill material and each layer thoroughly and carefully compacted as specified. Bring backfill up to bottom of gravel base and/or loam.

b. In other areas, the trench above the center- line of the pipe shall have suitable backfill material placed and compacted in eighteen (18) inch maximum layers as specified.

B. The nature of the excavated materials will govern both their acceptability for backfill and the method best suited for their placement and compaction in the backfill.

1. Both the materials and the methods shall be subject to the acceptance of the Engineer.

2. No stones or rock larger than 8" in the greatest dimension shall be placed in the backfill.

C. Backfilling in public right-of-way, along the streets or highways in or along shoulder, berm or backslope shall be done in accordance with the specifications and requirements of the state or municipality, whichever is responsible for the street or highway involved. Responsibility for the fulfillment of permit conditions or any other applicable requirements of the street or highway authority shall be the obligation of the Contractor. Surface restoration shall be carried out to the satisfaction of the street or highway authority or as shown on the plans.

D. Backfilling shall follow pipe laying as closely as reasonable, so that a minimum of trench shall be open at any time. The regulations of the highway authorities shall be observed as regards the amount of trench to be open at any one time. Overnight, and especially over weekends and holidays, the amount of open trench shall be kept at an absolute minimum. Any caved-in trench, especially after heavy rain and flooding, shall be cleaned out and the bottom consolidated before any additional pipe shall be laid.

3.10 TOP OF BACKFILL

A. In paved and shoulder areas, backfill shall be carried up to pavement or shoulder sub-grade ready to receive the gravel base. In other areas, backfill shall be brought up to adjacent finished grade minus the depth of any required topsoil and so as to provide a finished surface slightly mounded over the trench. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, and shall then be

refilled and compacted with the surface restored to required grade and degree of compaction, mounded over, and smoothed off, at no additional expense.

B. In unpaved areas, the gravel topping shall be left in a smooth and even condition, with no large stone on or in the surface. In cases where a paved surface has been broken, a temporary bituminous patch and/or a permanent paving restoration shall be made as required by the appropriate local or state road authority.

3.11 COMPACTION

A. Compaction densities specified herein shall be the percentage of the maximum density obtainable at optimum moisture content as determined and controlled in accordance with AASHTO Standard T-180, Method A or D depending on the material size. Field density tests shall be made in accordance with AASHTO Standard T-147.

B. Each layer of backfill shall be moistened or dried as required and shall be compacted to the following densities, unless otherwise specified in the project specifications.

1. Bedding material: 80%

2. Suitable backfill material under paved or shoulder areas: 90%

3. Gravel base

    a. Under paved areas: 95%

    b. In shoulder areas: 90%

    c. As replacement for unsuitable material excavated below grade: 90%

4. Loam areas: 90%

5. All other areas: 85%

C. Methods and equipment proposed for compaction shall be subject to prior acceptance by the Engineer. Compaction generally shall be done with vibrating equipment. Displacement of, or injury to, the pipe and structure shall be avoided. Movement of in-place pipe or structures shall be at the Contractor's risk. Any pipe or structure damaged thereby shall be replaced or repaired as directed by the Engineer and at the expense of the Contractor.

D. Testing:

1. Field density tests may be ordered by the Engineer for each foot of depth of backfill at an average interval of 200 feet along the trench.

2. The Contractor shall furnish all necessary samples for laboratory tests and shall provide assistance and cooperation during field tests. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.

3. The Owner shall pay for the initial field-testing costs, if required. Payment is limited to 3rd party testing service only, not downtime or other ancillary costs borne by the contractor.

4. Any costs of retesting required as a result of failure to meet compaction requirements shall be borne by the Contractor.

3.12 FILL AND GRADING

A. Excavated material not required for backfilling around pipes or structures may be used for fill in areas which require material for re-grading.

B. The re-grading shall be carried out as directed by the Engineer, so that all surface water will drain towards brooks or drainage pipes.

C. All material shall be of such nature that after it has been placed and properly compacted, it will make a dense and stable fill.

3.13 PROTECTION OF EXISTING STRUCTURES

A. All existing pipes, wires, poles, fences, property line markers and other items, which must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from injury by the Contractor, at no additional cost to the Owner. Should such items be injured, they shall be restored by the Contractor, without compensation therefore, to at least as good condition as that in which they were found immediately before the work was begun.

3.14 ACCOMMODATION OF TRAFFIC

A. The Contractor shall construct and maintain, without extra compensation, such adequate and proper bridges over excavations as may be necessary or as directed for the safe accommodation of pedestrians and vehicles. The Contractor shall furnish and erect, without cost to the Owner, substantial barricades at crossing of trenches, or along the trench, to protect the traveling public.

B. The Contractor shall not obstruct fire hydrants.

-- END OF SECTION --

Section 02536

Temporary Water Systems

REVISION TABLE

Revision Number	Revision Date	Description
2025-01	*12/19/2025*	• *Various minor edits throughout.* • *Requirement for pressure reducing valves (PRV) defined.* • *Added ball valves as allowable fittings for blowoffs and service connections.* • *Requirement for valves on temporary mains to be gate valves defined.* • *Requirement for systems with PRVs regarding backflow prevention defined.* • *Defined working hours and responsibility related to repairs on temporary system.*

PART 1 - GENERAL

1.01 SCOPE

A. In order to maintain uninterrupted water service to District customers, the Contractor shall provide temporary above ground water systems. The temporary water systems consist of mains, services and fire department outlets. The above ground systems shall be installed only for the duration of permanent water main replacement and removed promptly after main replacement is complete.

B. The temporary water system shall be active only between April 15th and October 15th.

1.02 SUBMITTALS

A. Submittals shall be provided by the Contractor to the Owner as outlined in Section 01300 for the following items related to the temporary water system:

1. A description of the pipe material, fitting type, and joining method for the proposed temporary water system.

2. Test results for all backflow prevention devices installed prior to testing as outlined in subsection 3.04.A.3.

3. Licensing for any plumbers performing work on the temporary water service connections and documentation of any permits required for that work as outlined in subsection 3.010.A.

4. A description of the inventory of spare parts available for the temporary water system as outlined in subsection 3.013.

1.03 DESIGN PARAMETERS

A. PVC

1. Pipe must have a pressure rating of 200 psi.

2. Pipe must have a listed Dimension Ratio of DR 21.

3. Pipe must be NSF 61 certified.

B. HDPE

1. Per AWWA C901, C906 and M55, the Allowable Total Pressure during Recurring Surge conditions equals 1.5 times the pipe's pressure class. Allowable Total Pressure during Occasional Surge conditions equals 2.0 times the pipe's pressure class.

2. Table 1 lists the required pressure classes, Allowable Total Pressure during Recurring and Occasional Surges for PE4710.

Table 1: PE4710 Preferred Pressure Classes per AWWA C906 and C901 (up to 80°F)

Pipe Dimension Ratio (DR)	Pressure Class / Rating (psi)	Allowable Total Pressure during Recurring Surge (psi)	Allowable Total Pressure during Occasional Surge (psi)	Allowable Hydrotest (Field) Pressure (psi)
DR 9	250	250	375	500
DR 11	200	300	400	300

1.04 DELIVERY, STORAGE, AND HANDLING

A. If any gouges, scrapes, or other damage to the pipe results in wall loss 10% or greater (of the pipe wall thickness), cut out that gouged section and do not use.

B. Pipe delivered for construction shall be strung and protected so as to prevent entrance of any foreign material.

PART 2 - PRODUCTS

2.01 PIPE

A. GENERAL

1. Only authorized District personnel shall operate control valves attached to these systems.

2. The Contractor shall follow the pipe manufacturer's installation guidelines when installing temporary systems.

3. Follow Manufacturer's installation instructions for cutting pipe.

B. PVC

1. An approved joint lubrication for the installation of potable water pipe shall be used on all joints prior to connecting pipe.

2. All PVC joints, including those on cut lengths of pipe, shall be grooved to provide a restrained joint. Pre-fabricated bends, elbows, and tees shall be used when changing direction.

3. Layout piping to minimize field grooving. Field grooving must be performed in accordance with all applicable Manufacturer's requirements.

4. Approved Manufacturers

   a. North American Pipe Corporation Certa-Lok Yelomine restrained joint PVC pressure pipe and fittings

   b. Victaulic Co. AquaMine restrained joint PVC pressure pipe and fittings

C. HDPE

1. FOUR (4) INCH AND LARGER PIPE PER AWWA C906

   a. HDPE pipe with 4-inch and larger diameter shall be PE4710 conforming to the latest edition of ANSI/AWWA C906 and ANSI/NSF Standard 61.

      1) HDPE pipes shall be extruded by a PPI member with dependent listings in PPI TR-4, and shall meet the requirements of AWWA C906.

      2) Dimensions and tolerances for HDPE pipe and fittings shall meet the requirements of AWWA C906.

   b. HDPE pipe shall be rated for use at a pressure class of 200 psi. The outside diameter of the pipe shall be based upon the DIPS sizing system.

   c. Approved manufacturers are:

      1) Central Plastics

      2) Performance Pipe

      3) WL Plastics

      4) Infra Pipe Solutions

      5) JM Manufacturing

6) Ipex

2. TWO (2) INCH PIPE PER AWWA C901

a. HDPE pipe with 2-inch diameter shall be PE 4710 conforming to the latest edition of ANSI/AWWA C901 and ANSI/NSF Standard 61.

b. HDPE pipes shall be extruded by a Plastics Pipe Institute (PPI) member with dependent listings in PPI TR-4, and shall meet the requirements of AWWA C901. Dimensions and tolerances for pipe and fittings shall meet the requirements of AWWA C901.

c. Per AWWA C901, PE4710 pipe shall have a pressure class (min) of 250 psi. The outside diameter of the pipe shall be based upon the IPS sizing system.

d. Approved manufacturers are:

1) WL Plastics

2) Performance Pipe

2.02 FITTINGS

A. PVC

1. All fittings must be made with grooved ends.

B. HDPE

1. FOUR (4) INCH AND LARGER PIPE PER AWWA C906

a. Butt Fusion Fittings – HDPE Fittings shall be made of PE4710 and with a minimum Cell Classification as shown in Section 2.01.C.1.a. All HDPE fittings shall meet the requirements of AWWA C906 and shall have a pressure rating equal to the pressure rating of the pipe to which the fitting is joined.

1) Molded fittings shall be manufactured, tested and marked per ASTM D3261.

2) Fabricated fittings shall be manufactured, tested and marked per ASTM F2206, or individual fittings standards.

b. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell Classification as noted in Section 2.01.C.1.a. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings shall be according to ASTM F1055.

c. Flanges and Mechanical Joint adapters (MJ adapters) – Flanges and MJ adapters shall have a material designation code of PE4710 with a minimum Cell Classification as noted in Section 2.01.C.1.a. Flanges shall be made in accordance with ASTM F2880. MJ adapters shall be made to ASTM D3261. Flanges and MJ adapters shall have a pressure rating equal to the pipe to which it is joined unless otherwise specified on the plans.

Markings for molded or machined flange adapters or MJ adapters shall be per ASTM D3261.

2. TWO (2) INCH PIPE PER AWWA C901

   a. Butt Fusion Fittings – HDPE Fittings shall be made of PE4710 and with a minimum Cell Classification as shown in Section 2.01.C.2.a. All HDPE fittings shall meet the requirements of AWWA C901 and shall have a pressure rating equal to the pressure rating of the pipe to which the fitting is joined.

      1) Molded fittings shall be manufactured, tested and marked per ASTM D3261.

      2) Fabricated fittings shall be manufactured, tested and marked per ASTM F2206, or individual fittings standards.

      3) Socket fittings shall meet ASTM D2683.

   b. Electrofusion Fittings - Fittings shall be PE4710, with a minimum Cell Classification as noted in Section 2.01.C.2.a. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

   c. Flanges and Mechanical Joint adapters (MJ adapters) – Flanges and MJ adapters shall be PE4710, with a minimum Cell Classification as noted in Section 2.01.C.2.a. Flanged and MJ adapters can be made to ASTM D3261 or if machined, must meet the requirements of ASTM F2206. Flanges and MJ adapters shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flange adapters or MJ adapters shall be per ASTM D3261. Fabricated (including machined) flange adapters shall be per ASTM F2206.

   d. Mechanical Fittings for service pipes - Three primary mechanical fittings or connections can be used, which are: Stab or insert type; compression type; and clamp ring. Internal stiffeners shall be used for all mechanical fittings.

   e. Mechanical fittings shall be designed to restrain and to prevent pull-out or rotation.

   f. Service connections shall be electrofusion saddles with a brass or stainless-steel threaded outlet, electrofusion saddles, sidewall fusion branch saddles, tapping tees, or mechanical saddles.

   g. For electrofusion saddles with threaded outlet the size of the outlet shall be as shown on the plans. Electrofusion saddles shall be made from materials required in Section 2.01.C.2.a.

   h. For sidewall fusion saddles, the size of the saddle shall be as indicated on the plans. The saddle can be made in accordance to ASTM D3261 or ASTM F2206.

   i. Tapping tees shall be made to ASTM D3261 or D2683 and MSS SP-60.

2.03 PIPE AND FITTING IDENTIFICATION

A. PVC

1. The pipe shall be marked in accordance with the standards to which it is manufactured.

B. HDPE

1. The pipe shall be marked in accordance with the standards to which it is manufactured.

2. Markings shall include the following items: Nominal size (such as 12-inch), outside diameter base (such as DIPS), dimension ratio (such as DR 17), manufacturer's name or trademark, standard materials designation code (PE 4710), cell classification (e.g. PE 445574C), PE compound oxidative resistance for potable water (CC3), pressure class (such as PC 125), standard's designation (AWWA C906), manufacturer's production code, date of manufacture, mark of the certifying agency for potable water (such as NSF).

3. Color identification to identify pipe service is required. Stripes on the exterior pipe product shall be blue for potable water. Plain black HDPE pipe without color code markings may not be used.

2.04 VALVES

A. MAIN-LINE VALVES

1. PVC: Main-line isolation valves shall be resilient wedge gate valves. Restrained fittings shall be used for 4-inch and 6-inch valves. Valves shall be located as shown on the plan.

2. HDPE: Main-line isolation valves shall be resilient wedge gate valves. Valves shall be configured with Fusion by MJ Adapters. Valves shall be located as shown on the plan.

B. PRESSURE REDUCING VALVES

1. Pressure reducing valves shall be installed at connections of the temporary water system and the permanent water system (e.g., hydrant connections) when the permanent system has a static pressure that exceeds 80 psi. The pressure reducing valve shall be installed prior to activation of the temporary water system for service connections. Static pressure in the project area shall be depicted on the drawings. Pressure reducing valves shall be set such that the static pressure throughout the temporary water system does not exceed 60 psi.

C. BALL VALVES & CURB STOPS

1. Temporary water service lines and blowoffs shall be constructed with either a curb stop valve or a ball valve.

2. Curb stop valves utilized shall be in alignment with the requirements outlined in Section 02537.

3. Ball valves shall be brass quarter turn valves, lead free, NSF 61 certified, and rated for 160 psi. Handles shall be removed from each valve following installation and stored with the temporary main spare parts on site.

D. BLOWOFFS

1. 1-inch blowoffs shall be installed at the ends of all 2-inch temporary mains. The blowoff shall be constructed using a 1-inch brass curb stop or 1-inch brass ball valve.

2. 2-inch blowoffs shall be installed at the ends of all 4-inch or greater temporary mains. The blowoff shall be constructed using a 2-inch brass curb stop or 2-inch brass ball valve.

2.05 TEMPORARY FIRE CONNECTIONS

A. Temporary fire connections (temp hydrants) shall be connected to the temporary main with a 4-inch tee and 4-inch gate valve followed by a 90-deg fitting. A 4.5-inch NPT streamer port connection with cap shall be connected to the 90-deg fitting. The outlet of the connection shall be between one and two feet off the ground. All joints in connection shall be restrained, and the stream port and riser shall be anchored to the ground. The outlet and tee shall be braced adequately to withstand force of water pressure.

2.06 BACKFLOW PREVENTION DEVICES

A. TEMPORARY WATER MAINS

1. A testable double check valve assembly backflow prevention device shall be installed at the connection of the temporary water system to the underground water system prior to testing of the temporary system piping. Where subsurface connections are made to the underground water system, the device shall be installed at the surface. The size of the device shall be the same nominal size as the temporary water main. The device shall meet the standards outlined in AWWA C510 and be lead free.

B. TEMPORARY WATER SERVICE CONNECTIONS

1. A non-testable dual check backflow prevention device shall be installed on all temporary water service connections that are made above ground. The size of the device shall be the same nominal size as the temporary water service. The device shall meet the standards outlined in ANSI/ASSE Standard 1024 and be lead free.

PART 3 - EXECUTION

3.01 PREPARATION

A. Temporary above ground water mains shall be installed in a manner to both protect the public water supply and to minimize customer service interruption. To allow the District to notify its affected customers, the Contractor shall provide the District a minimum of fifteen (15) working days' notice prior to installing any temporary lines.

3.02 SYSTEM LOCATION

A. A reference temporary main design has been included in the Drawings. The Contractor shall field-route the temporary water system piping as shown in the Drawings. Changes to the plan proposed by the Contractor may only be made with written approval by the Owner.

B. Temporary mains shall typically be installed behind sidewalks or along the edge, and within the public right of way. Temporary mains shall follow a uniform straight course and shall not bow to accommodate long sections of pipe. Temporary mains shall not be installed on private property. Temporary mains shall be installed in a manner that will not cause a hazard for pedestrians and/or traffic.

C. The route of temporary services lines installed from the mains to buildings shall be acceptable to the property owner.

D. Temporary water mains shall be installed such that there is no disturbance to existing sidewalk ramps.

3.03 CROSSINGS AND TRANSITIONS

A. Driveway crossings: 6-inch and 4-inch temporary mains shall be buried just below the surface of the driveway such that it is protected from overhead traffic. For temporary mains less than 4-inch, a gravel or cold patch raised berm shall be placed over temporary mains to prevent vehicles from dragging along the ridge.

B. Sidewalk crossings: An Americans with Disabilities Act (ADA) compliant ramp shall be constructed or placed over temporary mains to eliminate tripping hazards and allow for wheelchair access on affected sidewalks. Gravel and reclaimed asphalt pavement may not be used to ramp over temporary water piping.

C. Roadway crossings: Temporary mains shall be buried just below the surface of the roadway such that it is protected from overhead traffic. The pipe shall be protected with clean sand or material free from rocks, as the rocks tend to punch through the pipe when exposed to heavy traffic. The use of cold patch or QPR as fill material is acceptable.

D. Curbing or esplanade rise: To accommodate curb rise, pre-fabricated bends and/or elbows shall be used. Sweeping or bending the actual pipe is not an acceptable method unless the sweep lies flat on the ground and is not obstructing walkways. A traffic barrel shall be placed near the curb at offset connections to protect the offsets from being damaged by vehicles.

3.04 CONNECTIONS TO UNDERGROUND WATER SYSTEM

A. HYDRANT CONNECTIONS

1. Temporary water main shall be connected to an active hydrant using flanged HDPE Pipe connected to the hydrant port with brass or SAE 304 stainless steel fittings. The port that is utilized on the hydrant for the temporary connection shall be determined by the size of the connection (i.e., 2-inch pipe shall be connected to the 2.5-inch port, and 4 and 6-inch pipe shall be connected to the 4.5-inch port). The connection to the port shall be constructed with a National Pipe Taper (NPT) to HDPE transition. Piping supports and blocking shall be provided at all fittings.

B. CONNECTION TO UNDERGROUND WATER SYSTEM

1. Temporary water main shall be connected to the underground water system either through a tap on the existing water main or an installed tee as shown in the Drawings. Temporary water piping shall be directed to grade such that it surfaces outside of the paved roadway. These

connections shall have a valve at the main (corporation, tapping valve, or valve connected to the tee), as well as a valve or curb stop installed on the temporary water piping immediately where it surfaces. Any temporary water connections to the main must be removed at the end of the project as described in the Drawings.

3.05 BACKFLOW PREVENTION

A. TEMPORARY WATER MAIN CONNECTIONS

1. The backflow prevention device shall be installed in the location shown in the Drawings.

2. The backflow device may only be removed at the Owner’s request and Engineer's written approval. Backflow devices shall normally remain installed until substantial completion. If otherwise removed, the device shall be replaced with a flanged HDPE spool piece.

    a. In the event a pressure reducing valve is required for the temporary water system, the backflow prevention device may be removed and replace with the pressure reducing valve following testing prior to activation for service connections.

3. Prior to activation of the temporary water system for testing, the backflow device shall be tested to ensure it is in proper working order by a person certified by the New England Water Works Associations or American Backflow Prevention Association. Documentation of a passing test shall be provided to the Owner. This test shall be performed following installation of the device, documentation of annual testing of the device from a previous installation shall not be accepted.

B. TEMPORARY SERVICE CONNECTIONS

1. See subsection 2.06.B.1.

3.06 TEMPORARY FIRE CONNECTION CONFIGURATION

A. Temporary fire connections (temporary hydrants) shall be installed in the temporary water system as indicated on the Drawings.

B. Temporary fire connections must be covered when the temporary main is not active.

3.07 JOINING METHODS

A. PVC

1. The pipe and fittings shall be joined by Certa-Lok joints in accordance with ASTM D3139.

B. HDPE

1. The pipe and fittings shall be joined by butt fusion or electrofusion couplings, mechanical joint (MJ) adapters, or by flange connections in accordance with manufacturer’s recommendations and as required in this document. Unless otherwise shown on Drawings and except for connections to existing utilities, all joints shall be fused.

    a. Butt Fusion: The pipe shall be joined by heat fusion of the ends. Prior to fusion the pipe shall be clean and the ends shall be cut square. Butt-fusion joining is applicable to pipes

that have the same nominal outside diameter and wall thickness, within one SDR. Refer to ASTM F2620, ASTM F3124, ASTM F3183 and ASTM F3190.

b. Saddle fusion: Saddle fusion shall be done in accordance with ASTM F2620 or TR-41 or the fitting manufacturer's recommendations and PPI TR-41. Saddle fusion joints shall be made by qualified fusion technicians.

c. Socket Fusion: Molded socket fusion fittings are only to be used for joining of 2-inch HDPE pipe. Socket fusion shall be done in accordance with ASTM F2620 or the fitting manufacturer's recommendations. Socket fusion is the process of fusing pipe to pipe, or pipe to fitting by the use of male and female ends that are heated simultaneously, and pressed together so the outside wall of the male end is fused to the inside wall of the female end.

d. Electrofusion: Electrofusion joining shall be done in accordance with the manufacturers recommended procedure and ASTM F1055, ASTM F1290, MAB-01 and MAB-02. The installer must remove oxidation from the pipe and maintain a clean surface on both pipe and fitting to ensure acceptable joint quality.

e. MECHANICAL

1) Mechanical connection of HDPE to auxiliary equipment such as valves, pumps, and fittings shall use flanges or mechanical joint adapters and other devices in conformance with the PPI Handbook of Polyethylene Pipe, Chapter 9 and AWWA Manual of Practice M55, Chapter 6. Mechanical connections shall be manufactured for HDPE pipe and approved by the connection manufacturer for use with polyethylene pipe. Flanges and MJ adaptors should be double checked for butterfly valve clearance to allow full disc rotation and movement prior to installation in the trench. Uncontrolled tapering or hand-beveling in the field is not allowed.

2) Mechanical connections on 2-inch pipe are available to connect HDPE pipe to other HDPE pipe, or a fitting, or to a transition to another material. The use of stab-fit style couplings is allowed, along with the use of metallic couplings of brass and other materials. All mechanical and compression fittings shall be recommended by the manufacturer for use with HDPE and with potable water. Refer to fittings manufacturers and to Polyethylene Piping Systems Field Manual for Municipal Water. Manufactured transition fittings are also available.

3) Mechanical couplings that wrap around the pipe and act as saddles are made by several manufacturers specifically for HDPE pipe. All such saddles, tapping saddles, couplings and clamps shall be recommended by the manufacturer as being designed for use with HDPE pipe at the required pressure class (Section 1.02); all mechanical couplings shall be fully restrained either by themselves or by an alternate means.

f. Mechanical Joint/Flange: A flange assembly consists of a metal back-up flange or bolt-ring and a polyethylene flange adapter. MJ assembly consists of a MJ adaptor with gland ring, gasket and bolt kit. Both MJ adapters and flange adapters are fused onto the plain end of the pipe main. Bolting guidance for MJ connections is provided in AWWA C600 and guidance for flanges and gaskets is provided in PPI-TN38. Note that an HDPE flange adapter acts as both a flange and a gasket, and as such, no 'gasket' is required. For further information, refer to PPI TN38.

3.08 DISINFECTION

A. All 2-inch diameter and larger temporary mains shall be chlorinated, sampled, and tested for bacteria prior to activating any portion of the temporary mains in accordance with Section 02595 Disinfection of Water Mains.

3.09 PRESSURE TEST

A. All systems shall be watertight. A static pressure test shall be performed on all systems prior to disinfecting any portion of the system. Testing procedure shall be as follows:

1. Install a pressure gauge at the furthest end of the system.

2. Open main feed valve to fully charge the system with water and bleed all air.

3. Record the static pressure reading.

4. Close the main feed valve.

5. The system must hold static pressure for a minimum of 30 minutes with no losses.

3.010 RESTRAINT OF TEMPORARY WATER MAIN

A. The Contractor shall install the above-ground temporary water main in a manner to restrict the main from movement while active. The method and application of restraint (e.g., sand bags at changes of directions, burying the main) shall be determined by the Contractor as they see appropriate to maintain a safe and secure above-ground water system.

3.011 SERVICE LINE CONNECTIONS

A. GENERAL

1. Unless noted otherwise, all temporary individual service lines shall be 3/4-inch poly tube rated at a minimum working pressure of 160 psi.

2. Connection of the temporary service piping to exterior plumbing shall be performed by the Contractor with Owner oversight. The Contractor shall be responsible for shutting internal valving around the meter with Owner oversight prior to activating a temporary water service. Coordination with the building owner regarding entering the building to shut valving shall be the responsibility of the Contractor.

3. Anti-siphon sill cocks shall be disassembled by the Contractor or their licensed plumber with Owner oversight.

4. Excavating and connecting into existing underground service lines may be required where properties have malfunctioning sill cocks or no exterior plumbing. Alternately, Contractor may hire a licensed plumber to fix malfunctioning plumbing or install new exterior plumbing. Contractor is required to obtain all necessary state and/or local permits associated with the plumbing work. Licensing and permit information shall be provided to the Owner in advance of any work being completed. Contractor is responsible for coordinating with the building owner to determine the specific plumbing scope of work and schedule.

B. CONDITIONS REQUIRING UNDERGROUND SERVICE CONNECTIONS

1. If a building is served by a residential sprinkler system that is served after the meter and before a backflow preventer (e.g., NFPA 13D residential sprinkler system), the temporary service connection must be made behind the existing curb stop.

2. If a building to be connected is a commercial use and/or has a testable backflow prevention device installed on the domestic service line, the temporary domestic service connection must be made behind the existing control valve (e.g., curb stop).

3. If the meter on the service line cannot be isolated (i.e., there is not a valve on one or both sides of the meter), the temporary service connection must be made behind the existing curb stop.

C. BACKFLOW PREVENTION

1. See subsection 2.06.B.1.

D. PVC

1. The service lines shall be connected to a 3/4-inch factory tapped restrained joint coupling. This connection will be paired with a 3/4-inch close brass nipple, a 3/4-inch curb stop or 3/4-inch brass ball valve and a brass poly tube adapter 3/4-inch insert. The tube shall be extended to a sill cock (outside faucet) and connected using the same poly tube adapter. Prior to connecting the service, a garden hose connection, including a brass boiler drain or sill cock valve shall be installed in the line. All service lines shall be flushed prior to activating mains.

E. HDPE

1. Small Service (≤ 2-inch)

a. An electrofusion service saddle or standard service saddle shall be used to make service connections. This connection will be paired with a 3/4-inch close brass nipple, a 3/4-inch curb stop or 3/4-inch brass ball valve and a brass poly tube adapter 3/4-inch insert. The tube shall be extended to a sill cock (outside faucet) and connected using the same poly tube adapter. Prior to connecting the service, a garden hose connection, including a brass boiler drain or sill cock valve shall be installed in the line. All service lines shall be flushed prior to activating mains.

2. Large Service (>2-inch)

a. A butt fused tee with a fusion by MJ adaptor to a gate valve shall be used to make service connections.

3.012 CONDITIONS OF ACTIVATION OF TEMPORARY SYSTEMS

A. ACTIVATION FOR TESTING

1. Prior to activation of the temporary water system for testing, the Contractor shall provide the Owner at a minimum the following:

a. Record of passing test results for all backflow prevention devices being utilized.

b. An inventory of all spare parts for the temporary system available, their location, and the method of access required for the part (e.g., lock code). The minimum requirements for this are outlined in Section 3.012.B.

B. ACTIVATION FOR SERVICE

1. Prior to activation of the temporary water system for service, the Contractor shall have achieved passing results in the following tests:

a. Pressure testing as outlined in Section 3.08 above.

b. Bacteria testing as outlined in Section 3.07 above.

3.013 MAINTENANCE OF TEMPORARY SYSTEMS

A. The contractor shall be responsible for maintaining the temporary systems during regular working hours including making repairs to the systems. The District's Inspector must be on site prior to any work, or repairs being performed on the temporary water systems. District crews will respond to all emergencies outside of regular working hours. All affected customers shall be notified as soon as possible prior to any service interruption.

1. Regular working hours should normally be defined as 7:00am to 5:00pm.

2. In the event of a break in the temporary water system while the Contractor is on site, the Contractor shall immediately repair the break under inspection by the District.

a. In the event that a break occurs outside of working hours and the Contractor is actively working on site, the Contractor shall be responsible for making the required repair.

3. Once temporary water main is activated and any number of services are connected, Contractor shall maintain an active presence on the project site during regular working hours unless otherwise approved by Owner.

4. Temporary water main that is left activated with no services connected for more than one (1) calendar week shall be flushed and sampled prior to connection of any services.

B. The contractor will keep an inventory of readily available spare parts on hand enabling quick response to address repair needs. Spare parts shall include at least two extra fittings for each type used and at least two lengths of pipe. The use of non-restrained joint couplings is prohibited. Joint leaks shall be cut out. The use of stainless-steel wrap around repair clamps over pinholes is acceptable.

1. The contractor must ensure that adequate resources are immediately dedicated to repair of the temporary water system in the event of a leak.

2. Inventory shall be periodically inspected by the Owner. In the event that the inventory does not have the required parts, the Contractor will be notified of the deficiency in writing. The Contractor will have two working days to replenish the spare parts inventory following the written notice. If the parts are not replaced, the Owner may halt work until the spare parts have been replenished at no additional expense to the Owner.

3.014 RESTORATION

A. The site shall be restored to its original condition following the removal of the temporary water system piping. This shall include, but shall not be limited to, removal of buried pipe, loaming and seeding affected grassed areas, sidewalk repair, trench repair, replacement of curbing, removal of material used for crossings, restoration of driveway entrances, and cleanup of storage area.

B. Restoration of sidewalk ramps to ADA Standards, and costs associated to that restoration, that is required due to disturbance to the ramp by temporary water mains installed by the Contractor or their Subcontractor shall be the responsibility of the Contractor.

-- END OF SECTION --

Section 02537

Water Distribution System

REVISION TABLE

Revision Number	Revision Date	Description
2025-01	*12/19/2025*	• *Various minor edits throughout.* • *Repair Sleeves removed from Section.* • *Foster Adapters defined as approved for use.* • *Restrained Joint Gasket options added to approved manufacturers.* • *ROMAC tapping saddles added to approved manufacturers.* • *Triple Tap Tapping Sleeve added to approved manufacturers.* • *Deflection limit for installing ductile iron pipe defined.* • *Field torque test for hydrant requirement removed.*

PART 1 - GENERAL

1.01 SCOPE

A. This section includes the furnishing and installing of ductile iron and PVC water pipe and ductile iron or cast iron fittings as specified.

1.02 SUBMITTALS

A. Submittals shall be provided by the Contractor to the Owner as outlined in Section 01300 for the following items related to the water distribution system, as required by the specific project. Not required for Owner supplied materials:

1. Bolts
2. Corporation Stop
3. Copper Pipe
4. Curb Stop
5. Cut in Sleeve
6. Ductile Iron Fittings
7. Ductile Iron Pipe
8. Insertion Valve
9. Fire Hydrant
10. Pipe Joint Restraint

11. Polyethylene Encasement (Poly Wrap)

12. PVC Pipe

13. Resilient Seated Gate Valve

14. Restrained Joint Gaskets

15. Service Box and Rod

16. Service Saddle

17. Stainless Steel Repair Clamp

18. Tapping Sleeve

19. Temporary plug

20. Tracer Wire & Marking Tape

21. Valve Box

PART 2 - PRODUCTS

2.01 GENERAL

A. Upon approval of the proposed Manufacturer and Product Series, the Contractor shall utilize that source for said material for the entirety of the Work unless otherwise approved by the Engineer to maintain consistency throughout the project.

B. Pipe delivered for construction shall be strung and protected so as to prevent entrance of any foreign material. Pipes that require cleaning as deemed necessary by the Owner shall be cleaned by the Contractor.

C. Any defective or imperfect materials furnished by the Contractor shall be marked as such and removed immediately from the site. Satisfactory materials shall be substituted for that rejected at no additional cost to the Owner.

D. All materials, products and coating that contact drinking water shall be certified to meet NSF/ANSI Standard 61 – latest revision, Drinking Water System Components – Health Effects.

2.02 BOLTS

A. Stainless Steel

1. Stainless steel bolts shall be Type 304 and contain the addition of Molybdenum to the nickel-chromium steels.

B. High Strength/Low Alloy Steel

1. Trade name for cold formed T-head bolts containing alloying elements such as copper, nickel, and chrome (Cor-Blu).

2.03 CORPORATION STOP

A. Conforming to AWWA C-800.

B. 3/4-inch to 2-inch curb stops shall be ball valve design with brass ball that is Teflon coated or brass ball with Teflon seats.

C. The ball shall be supported by seats which are water tight in either direction.

D. The valve shall have a full port opening.

E. The body of the corporation stop shall be of heavy-duty design.

F. The valve working pressure shall be 300-psi.

G. Approved Manufacturers:

1. A.Y. McDonald

2. Cambridge Brass

3. Ford Meter Box Co.

4. Mueller Co.

2.04 COPPER PIPE

A. Conforming to ASTM B88.

B. Pipe shall be Type K.

C. Conforming to NSF/ANSI 61.

2.05 CURB STOP

A. Conforming to AWWA C-800.

B. 3/4-inch to 2-inch curb stops shall be ball valve design with brass ball that is Teflon coated or brass ball with Teflon seats.

C. The ball shall be supported by seats which are water tight in either direction.

D. The valve shall have a full-port opening.

E. The valve shall open with 1/4 turn (90°) with a check or stop.

F. The valve shall not have a drain.

G. The valve stem shall have 2 “O” rings and a bronze ring lock which holds the stem solidly in the valve body.

H. The valve body shall be of heavy-duty design.

I. The valve working pressure shall be 300-psi.

J. Approved Manufacturers:

1. A.Y. McDonald

2. Cambridge Brass

3. Ford Meter Box Co.

4. Mueller Co.

2.06 CUT-IN SLEEVE

A. The sleeve shall be mechanical joint to plain-end type.

B. The sleeve shall fit over either AB or CD pattern pipe.

C. Interior coating– Seal-coated – AWWA C104-74, min. 4 mils D.F.T.

D. Exterior coating – Bituminous coated, min. 4 mils D.F.T.

E. Mechanical joint connections

1. Glands: Duck-tipped for AB pipe, Plain Gaskets for CD pipe

F. Cut-in sleeves shall have at least one stop-screw in sizes up through 10-inch and at least 2 stop-screws in 12-inch size.

G. The stop-screw “O” ring shall be recessed into the body of the sleeve between stop-screw and body.

H. Approved Manufacturers

1. Mueller Co.

2.07 DUCTILE IRON FITTINGS

A. Fittings include but are not limited to bends, reducers, off-sets, tees and sleeves.

B. Material shall be ASTM A536 (latest revision), grade 70-50-05, in accordance with AWWA C110 (latest revision) for fittings larger than 24-inch and C153 (latest revision) for fittings 3-inch through 24-inch.

C. Fittings shall be cement lined AWWA C104 (latest revision) or fusion bonded epoxy coated with a 5-mil nominal thickness per AWWA C550 and C116.

D. Interior seal coated AWWA C104 with minimum of 4 mils dry film thickness.

E. Exterior bituminous coated, 4 mils minimum dry film thickness or fusion bonded epoxy coated with a 5-mil nominal thickness per AWWA C550 and C116.

F. Sleeves shall not be cement lined, but shall be bituminous coated inside to 4 mils dry film thickness. All sleeves shall be long body type.

G. Class 350 pressure rating in accordance with AWWA C153 - 3-inch - 24-inch sizes.

H. Class 250 pressure rating in accordance with AWWA C110 - 30-inch - 48-inch sizes.

I. The "compact design" fittings must provide adequate space for the MJ joint and accessories to be installed without special tools (i.e., Lowell wrench can be used).

2.08 DUCTILE IRON PIPE

A. Ductile iron pipe shall meet requirements of AWWA Standard C-151 (latest revision) and be cement lined and seal coated to meet AWWA Standard C-104 (latest revision).

B. Joints shall meet requirements of AWWA C-111 (latest revision).

C. Interior seal coated, bituminous paint oil cut, emulsion not acceptable, thickness minimum of 2 mils dry film thickness.

D. Exterior bituminous coated with minimum of 2 mils dry film thickness.

E. The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The zinc coating system shall conform to ISO 8179-1

F. Class 52 wall thickness.

G. State nominal laying length and mark shorter lengths near bell.

H. Approved Manufacturers

1. American Cast Iron Pipe Company

2. U.S. Pipe

3. McWane Ductile

2.09 FIRE HYDRANT

A. The hydrant shall open right.

B. Operating nut shall be DI or bronze, pentagon in shape with dimensions:

1. Top 1-13/16-inch tapering to 1-7/8-inch on bottom

C. Nozzles:

1. Two (2) each: 2-1/2-inch National Standard Thread

2. One (1) each: 4-1/2-inch National Standard Thread

D. Port covers shall be supplied without chains and shall have the same size pentagon operator as specified in 3.0(b) above.

E. Traffic model hydrant with breakaway feature.

F. Barrel Length

1. 6 ft. cover, 6.5 ft. bury; or

2. 5.5 ft. cover, 6 ft. bury; or

3. 5 ft. cover, 5.5 bury

G. Hydrant shoe or base shall have 6-inch MJ inlet and 5-1/4-inch valve opening with non-draining bronze seat that is permanently plugged. Valve seat and sub-seat arrangement shall be bronze to bronze. Horizontal and vertical blocking planes manufactured into hydrant base.

H. Protective Coatings

1. All paintings and coatings shall be a minimum of 3 mils total dry film thickness, unless noted

2. The internal area of the hydrant base, which is normally exposed to water and which includes the internal body of hydrant shoes, including lower valve plate, shall be epoxy coated

3. All internal and external cast iron or ductile iron components shall be coated with an approved bituminous coating, 3 mils minimum.

4. Coatings for upper barrel - exterior:

a. Surface preparation blast clean SSPC-SP-6

b. Primer Sherwin Williams Red Oxide E61RC21, 1.5 mils, dry

c. Finish coat Sherwin Williams – Regal Yellow, F78Y30, 1.5 mils, dry or sufficient paint to hide the second coat

d. Total dry film thickness - 3 mils minimum

5. Coatings for bonnet, operating nut, port cap:

a. Surface preparation: Blast clean, SSPC-SP-6

b. Exterior primer

c. Exterior aluminum

d. Total dry film thickness: 3 mils minimum.

I. The Owner shall install flow indicator collars on all new hydrants.

J. Approved Hydrants:

1. Clow Medallion

2. American Darling Models: B62B-1, B62B-5

3. Kennedy Guardian Model: K81D

2.010 INSERTION VALVE

A. Valve shall meet or exceed all requirements of ANSI/AWWA C-515 and ANSI/NSF 61.

B. Valve shall have a working pressure rating of 350psi.

C. Valve body, bonnet, stuffing box, and operating nut shall be made of ductile iron meeting ASTM A536. Body and bonnet shall meet the minimum wall thickness outlined in AWWA C-515. Operating nut shall be two (2) inch square.

D. Valve shall have a non-rising stem.

E. Valve ends shall be mechanical joint.

F. Valve stem diameter and number of turns shall be in line with AWWA C-515. Valve stem shall be bronze alloy meeting ASTM B98.

G. Valve shall be of type such that it shall seat on itself.

H. Valve shall open right.

I. Concrete base support shall be installed as required by the Manufacturer.

J. Approved manufacturers

1. Mueller PERMASEAL

2. TEAM InsertValve

2.011 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

A. HDPE pipe shall be manufactured in accordance with AWWA C906. This material shall have a long-term Hydrostatic Strength of 1600 psi when tested in accordance with ASTM D2837. HDPE shall be manufactured from PE 4710 polyethylene compounds that meet or exceed ASTM D3350 cell classification 445574. The manufacturer shall comply with NSF Standard 61 and/or Standard 14 and must be certified by the NSF International for potable water.

B. The pipe and fittings shall have a Standard Dimension Ratio (SDR) of 11 and be rated for a working pressure of 200 psi at a temperature of 75 degrees Fahrenheit with a service life of 50 years. All pipe and fittings shall be ductile iron pipe size.

2.012 PIPE JOINT RESTRAINT

A. Use in conjunction with mechanical joint fittings.

B. The joint restraint ring and its wedging components shall be made of ductile iron conforming to ASTM A536-80.

C. Gasket should be made of styrene butadiene rubber (SBR) or nitrile butadiene rubber (NBR) as directed by the Engineer.

D. Dimensions of the restrainer must allow use with standard M.J. bell conforming to AWWA C111 and AWWA C153.

E. Restrainer must restrain up to 350-psi of working pressure in 3-inch to 16-inch sizes and 250-psi of working pressure in 18-inch to 48-inch sizes with a 2:1 safety factor.

F. Torque limiting twist off nuts shall be used to ensure proper actuation of the restraining wedges where applicable.

G. Approved Manufacturers

1. Sigma ONE-LOK

2. Ford Uni-Flange Series 1400

3. EBAA Mega Lug

4. Romac Grip Ring

5. Star Grip Series 300

6. Romac Romagrip

7. MJ FIELD LOK Gasket

2.013 POLYETHYLENE ENCASEMENT

A. Tube type polyethylene encasement shall be installed on all ductile iron pipe and fittings in accordance with AWWA Standard C105 - latest revision, Method A.

B. Polyethylene encasement shall be V-Bio variety comprised of a three-layer LDPE material with anti-corrosivity properties and a total thickness of at least 8mm.

C. Circumferential wraps of tape or plastic tie straps shall be placed at 2-ft. intervals along the barrel of the pipe.

D. The polyethylene encasement shall prevent contact between the pipe and the surrounding backfill and bedding material but is not intended to be a completely airtight or watertight enclosure. All lumps of clay, mud, cinders, and so forth, on the pipe surface shall be removed prior to installation of the polyethylene encasement. During installation, care shall be exercised to prevent soil or embankment material from becoming trapped between the pipe and the polyethylene.

E. The polyethylene film shall be fitted to the contour of the pipe to affect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack shall be

provided in contouring to prevent stretching the polyethylene where it bridges irregular surfaces, such as bell-spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene due to backfilling operations. Overlaps and ends shall be secured with adhesive tape, string, plastic tie straps, or any other material capable of holding the polyethylene encasement in place until backfilling operations are complete.

F. Three layers of polyethylene adhesive tape shall be wrapped around any polyethylene wrapped pipe where a tapping machine will be placed. All copper services connected to a pipe wrapped in polyethylene encasement shall be wrapped within three feet of the pipe.

2.014 PVC PIPE

A. Pipe shall be AWWA C-900 Pressure Class 305-psi (DR-14).

B. The pipe shall conform to standard ASTM 2241.

C. The pipe shall be provided in 20-foot lengths. If approved by the Engineer, field cutting per Manufacturer's recommended practices.

D. The gasket or O-Ring material shall be rubber meeting ASTM F 477 and of the "permanent use" type.

E. Where pipe slip joints are called to be restrained, restrained joint gaskets shall be internally installed from the manufacturer.

F. All small diameter service connections shall be made with tapping saddles.

G. Tracer wire and marking tape shall be installed along the length of the main.

H. Approved Manufacturers:

1. J-M Manufacturing - Blue Brute

2. Certainteed – Yelomine

3. Victaulic – Aquamine

4. IPEX – Blue Brute

2.015 RESILIENT SEATED GATE VALVE

A. Valve shall meet the latest revision of the AWWA C-515 and AWWA C-509 standards for 4-inch diameter valves and larger and 2-inch diameter valves, respectively.

B. Valve shall have a smooth unobstructed water way which shall be a minimum diameter of the valve.

C. Valve shall be rated for zero leak rate at 200-psi differential working pressure and have a 400-psi hydrostatic test for structural integrity.

D. Sealing - Valve shall have a minimum of 2 "O" rings situated such that the "O" rings above the thrust collar can be replaced with the valve under pressure and in the open position.

E. Valve stem shall:

1. Open right with a stem nut made of copper-alloy

2. Be on-rising

3. Include a thrust collar integrally cast to the stem

4. Include with two (2) thrust washers, placed one above and one below the stem thrust collar

5. Be constructed of copper-alloy or stainless steel

6. Constructed such that the thrust washers are made of a synthetic polymer with physical properties required or stainless steel

F. The body, including the stuffing box and the bonnet, shall be constructed of cast iron or ductile iron, meeting the latest revision of AWWA C-153

G. Wedge shall be constructed of ductile iron (less guiding mechanism), fully encapsulated and permanently bonded with a resilient elastomer, constructed such to allow the flushing of any interior exposed surface during operations.

H. Coatings

1. the internal and external valve body, including the stuffing box, bonnet, and interior of the wedge shall be fusion bonded epoxy coated with 8 mils D.F.T.

2. interior shall meet latest version of AWWA C-550

3. shall be holiday free, interior and exterior, per testing method described in AWWA C-550, Sec. 5.1

I. Operating nut shall be two inch (2-inch) square gray iron or ductile iron with a hold down nut (made of 316 stainless steel or silicone bronze), for tapered stems. Or, a stainless-steel pin inserted through the stem for full diameter stems.

J. Bolts – The seal plate and bonnet bolts shall be stainless steel (Type 316 or Type 304)

K. Valves 12-inch nominal diameter and smaller shall be directly operated by the nut on the valve stem and mounted vertically. Number of turns to open or close shall match the formula: (3 x D) + 2 within +/- 2 turns. For example, a 12-inch valve should open or close with (3 x 12) + 2 = 38 turns of the operating nut.

L. Valves larger than 12-inch nominal diameter shall be designed to be installed horizontally and shall have bevel gear operators driven by the operating nut. Valves 14-inch – 24-inch nominal diameter shall have 4:1 bevel gear operators. Valves with 30-inch – 36-inch nominal diameters shall have 6:1 bevel gear operators and valves with 42-inch – 48-inch nominal diameters shall have 8:1 bevel gear operators. Number of turns to open or close shall match the formula: ((3 x D) + 2) times the bevel gear ratio within +/- 4 turns. For example, a 24-inch valve should open or close with approximately ((3 x 24) + 2) x 4 = 296 turns of the operating nut.

M. Contractor may be required to supply a valve for inspection and approval of the coating system.

N. Approved Manufacturers (4-inch diameter and larger)

1. AFC Series 2500

2. Mueller A-2361/62

3. Clow Model 2638

O. Approved Manufacturers (2-inch diameter)

1. Mueller A-2361/62

2. Clow Model 2639/2640

2.016 RESTRAINED JOINT GASKETS

A. Accepted restrained joint gaskets in the Portland Water District distribution system shall be rated in accordance with the performance requirements of ANSI/AWWA C111/A21.11.

B. Required applications:

1. Any hydrant branch or service with a distance greater than 18-foot shall have an approved restrained joint gasket in the bell ends.

2. Where a casing is required, all joints within the casing shall have an approved restrained joint gasket unless restrained joint pipe is used.

3. At any time as required by the Owner or Engineer.

4. Any live service taps where there is a joint between the connection and the end of the service.

C. Approved Manufacturers

1. American Fast-Grip Gasket – American Pipe

2. Gripper Gasket FT Series – American Pipe

3. Field Lok 350 Gasket – US Pipe

4. ROMAC Piranha Gasket – US Pipe

5. Gripper Gasket GG Series –US Pipe

2.017 SERVICE BOX AND ROD

A. Service box

1. Shall be 1-inch Schedule 40 steel pipe with top having 1-inch N.P.T. pipe threads for screw-on cover or coupling.

2. Shall be Erie style with 6-foot slide-type riser.

3. Any extension of a service box requires a threaded merchant coupling with no set screw.

4. Approved Manufacturers

    a. Laroche

    b. Clow Canada

    c. Bibby

B. Cover

1. Cover shall allow for screw-on assembly with service box and meet ASTM A-48 Grade 30B. Shall be tapped with a 1-inch rope thread with a solid brass plug with pentagon operating head

2. Approved Manufacturers

    a. Bibby

    b. Laroche

    c. Clow Canada

    d. QWP

C. Service box foot piece

1. The standard foot piece shall be heavy duty (Ford style or equal) cast iron design.

2. The large, heavy-duty foot piece shall have an arch that will fit over 2-inch ball-valve curb stops

3. Approved Manufacturers

    a. Bibby

    b. Laroche

D. Service Rod

1. Shall have a self-aligning design

2. 36-inch length for all services

3. 24-inch length for air valves

4. Shall be round and constructed of stainless steel (304) with an epoxy coating (minimum 4 mil D.F.T.)

5. Shall have a yoke design that is an integral part of the rod

6. The curb-stop attachment pin shall be a brass cotter pin

7. The rod "wrench-flat" shall have a minimum thickness of 1/4-inch tapered to 1/16-inch and width of 5/8-inch or 1/2-inch.

8. Diameter:

    a. 1/2-inch for 1/2-inch, 3/4-inch, and 1-inch services

    b. 5/8-inch diameter for 1.5-inch and 2-inch services

2.018 SERVICE SADDLE

A. GENERAL

1. The saddle body shall be constructed of epoxy coated ductile iron.

2. The sealing gasket(s) shall be either Buna-N rubber or SBR rubber (ASTM D2000).

3. Service saddles shall be of a CC tap type.

B. PVC MAIN REQUIREMENTS

1. Service saddles installed on PVC mains shall have stainless steel straps.

C. HDPE MAIN REQUIREMENTS

1. Service saddles installed on HDPE mains shall have spring washers.

D. Approved Manufacturers (see accompanied table below)

1. Smith Blair

2. ROMAC

MAIN TYPE	MAIN SIZE	TAP SIZE	APPROVED SADDLES
GALV	2-inch	3/4-inch & 1-inch	Smith-Blair 315 Smith-Blair 317 ROMAC 101NU ROMAC 202NU
CAST	2.25-inch	3/4-inch & 1-inch	Smith-Blair 315 Smith-Blair 317
CAST & DI	4-inch - 12-inch	1.5-inch	Smith-Blair 313 Smith-Blair 331 ROMAC 101NU ROMAC 202NU
CAST & DI	4-inch - 12-inch	2-inch	Smith-Blair 313 ROMAC 101NU

			ROMAC 202NU
CAST & DI	16-inch	1.5-inch & 2-inch	Smith-Blair 313
CAST & DI	20-inch - 36-inch	1.5-inch & 2-inch	Smith-Blair 366
PVC	1-inch	3/4-inch	Smith-Blair 315
PVC	1.5-inch	3/4-inch & 1-inch	Smith-Blair 315 Smith-Blair 317 ROMAC 101NS
PVC	2-inch	3/4-inch & 1-inch	Smith-Blair 315 Smith-Blair 317 Smith-Blair 397 ROMAC 101NS ROMAC 202NS
PVC	4-inch - 12-inch	3/4-inch - 2-inch	Smith-Blair 317 Smith-Blair 397 ROMAC 101NS ROMAC 202NS
HDPE	2-inch	3/4-inch & 1-inch	Smith-Blair 317 ROMAC 101N-H
HDPE	4-inch - 12-inch	3/4-inch - 2-inch	Smith-Blair 317 ROMAC 101N-H ROMAC 202N-H

2.019 STAINLESS STEEL REPAIR CLAMP

A. The sleeve shall be of full circle design, either one piece or two pieces, for pipe sizes 2-inch through 12-inch

B. Body: Shall be 18-8 stainless steel shell.

C. Gasket: Shall be full length and diameter of the body size. This gasket shall form a multiple O-ring, or grid, sealing barrier for the entire length and circumference. Shall be virgin SBR rubber (ASTM D2000 AA 415)

D. Lugs, sidebar, and lifting bar shall be heavy gauge 18-8 stainless steel with TIG/MIG welding and chemical passivation of all welds.

E. Bolts and Nuts shall be Teflon coated 18-8 heavy gauge stainless steel.

F. Armor: The armor, or bridging plate between the side bars shall be heavy gauge 18-8 stainless steel bonded to the gasket to bridge the lug area.

2.020 TAPPING SLEEVE

A. 12-inch Diameter or Less

1. Tapping sleeve shall be ductile iron, stainless steel, or approved fabricated steel.

2. Tapping sleeve shall be mechanical joint with recessed outlet flange for tapping valve.

3. Tapping sleeve shall conform to AWWA C-207, Class D, with rated maximum working pressure of 200-psi.

4. The side rubber gaskets shall be rectangular in cross-section and fit into grooved channels in the casting. These gaskets shall extend the entire length of the sleeve and shall not require cutting or trimming to match MJ end gaskets.

5. Tapping sleeve shall be AB-CD pattern to permit use of plain rubber and duck-tipped gaskets for various O.D. piping sizes.

6. All flange outlet bolts shall be stainless steel (Type 304).

7. Interior and exterior to be bituminous coated with a minimum of 4 mils dry film thickness or fusion bonded epoxy coated.

8. The sleeve shall be provided with a 3/4-inch F.I.P.T. test port and brass lug.

9. Approved Manufacturers

    a. AFC

    b. Mueller Co.

    c. US Pipe

    d. Tyler / Union

    e. Powerseal Model 3490 and 3490 MJ (Fabricated Steel)

    f. Romac SST

    g. TPS Triple Tap

B. 16-inch Diameter or Greater

1. tapping sleeve shall be fabricated steel:

2. Body and Flange - A-36

3. Coating - Fusion-bonded epoxy coating with minimum D.F.T. of 5 mils, inside and out

4. Bolts, Nuts - Stainless Steel (Type 304)

5. Gaskets – SBR

6. Flange - AWWA Class D plate flange with ANSI 150# drilling, proper recessing for tapping valves

7. Sleeves shall be provided with 3/4-inch F.I.P.T. test port and plug

8. Approved Manufacturers

a. Romac FTS 420

b. Ford FTSC

c. Smith Blair 622

d. JCM 412

e. Powerseal Model 3490 and 3490 MJ (up to 24-inch)

f. JCM 415 or approved equal (for RCCP pipe only)

g. TPS Triple Tap

2.021 TRACER WIRE & MARKING TAPE

A. Water Main Marking Tape

1. Lineguard III by Tri-Sales, Inc., 2" wide, blue; detectable with magnetic locators, or approved equal.

B. Tracer Wire

1. Copperhead Industries part number 1230-SF, or approved equal.

C. Tracer Wire Splice Kits:

1. 3M Brand DBR Direct Bury Splice Kit, or approved equal.

D. Grounding Rod

1. Copperhead 1-lb, Drive-In Magnesium anode (part number ANO-1005 with part number SCB-01SR Connector), or equal.

2.022 VALVE BOX

A. General

1. Material shall be cast iron or ductile iron free from defects.

2. Interior and exterior of all components shall be bituminous coated with a minimum of 4 mils dry film thickness.

3. The minimum total length of valve box top and bottom sections shall be as follows:

a. Projects in Windham, Raymond, Standish: 78-inches.

b. Projects in all other municipalities: 72-inches.

4. Valve boxes shall be two (2) piece sets (i.e., top and bottom section).

5. Valve box sections and cover shall be round.

6. Valve box sections shall be of a slide or slip design.

7. Valve box bottom sections are not required to be of the same manufacturer as the top section.

8. Valve box top section and cover must be of the same manufacturer.

B. Valve Box Bottom-Section

1. The valve box bottom section shall have a bell-type base with bottom lip and have an inside diameter between 5-inches and 5.5-inches.

2. Approved manufacturers:

   a. Bibby St-Croix

   b. EJ

   c. Bingham & Taylor

   d. Tyler Union

   e. Sigma

C. Valve Box Top-Section

1. The valve box top section shall not have a top flange or “bead” or bottom flange and have an inside diameter of between 6-inches and 6.5-inches measured from the base.

2. Approved manufacturers:

   a. Bibby St-Croix

   b. EJ

   c. Bingham & Taylor

   d. Sigma

D. Valve Box Cover

1. The valve box cover shall be a drop-type design and have a 2-inch depth.

2. The word ‘water’ shall be cast into the cover

3. Approved manufacturers:

   a. Bibby St-Croix

   b. EJ

   c. Bingham & Taylor

PART 3 - EXECUTION

3.01 PIPE LAYING CONDITIONS

A. Pipe shall not be laid in water, or when trench conditions or weather conditions are unsuitable for such work.

B. The interior of each pipe shall be inspected while being joined to see that the alignment is preserved and to assure that no dirt or debris has entered the pipe after laying and partial backfilling.

C. Pipe fittings and accessories shall be carefully lowered into the trench, piece by piece, by means of derrick, crane, slings and other suitable tools and equipment, in a manner such as to prevent damage to the material or to its protective coating and linings. No chain or slings shall be passed through the inside bore of any pipe or valve or fitting. Under no circumstances shall piping materials be dropped or dumped into the trench.

3.02 LAYING DUCTILE IRON & PVC PIPE

A. As soon as the excavation is completed and the existing trench bottom has been brought to the proper grade, the pipe shall be laid.

B. All pipe, before being lowered into the trench, shall be inspected inside and out. Both ends shall be cleaned and any visible dirt or debris removed from inside the pipe and the interior of all affected pipe and fittings shall be swabbed with a 5% hypochlorite solution immediately before they are installed. Care shall be taken to lay the pipe to true lines and grades as shown on the drawings.

C. Coupling holes shall be excavated so that the barrel of the pipe shall bear upon the trench bottom.

D. Blocking under the pipe will not be permitted.

E. Each section shall rest upon the pipe bed for the full length of its barrel.

F. The circular rubber gasket shall be inserted in the gasket seat provided. A thin film of gasket lubricant shall be applied to the inside surface of the gasket. Gasket lubricant shall be an NSF60 certified solution of vegetable soap or other solution supplied by the pipe manufacturer.

G. The spigot end of the pipe shall be cleaned with an approved soap solution and entered into the rubber gasket in the bell, using care to keep the joint from contacting the ground. The joint shall then be completed by forcing the plain end to the seat of the bell. Pipe which is not furnished with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full depth of the joint.

H. Pipe shall be aligned with the preceding unit and laid so as to form a close joint with the adjoining pipe and bring the inverts continuously to the required line and grade.

I. No length of pipe shall be laid until the previous length has had sufficient material tamped about it to firmly secure it in place so as to prevent any movement or disturbance.

J. The pipe shall be laid with the bell ends facing the direction of the laying, unless otherwise permitted by the Engineer.

K. Maximum pipe deflection shall not exceed 76% of the manufacturer's maximum listed deflection.

L. Joints, when made, shall be done in the manner prescribed by the manufacturer of the pipe. In the case of rubber gasket joints, these joints shall be made up in accordance with the American National Standards for the jointing of cast iron pressure pipe and fittings. (ANSI/AWWA C111/A21.11).

M. Joints of all pipes in the trench shall be completed before work is stopped; and all openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons.

N. Thrust blocks shall be used behind tees, bends, or other fittings where shown. Size shall be appropriate for soil conditions and thrust forces acting on the specific fitting.

3.03 TRENCH BOTTOM

A. Should the trench bottom contain unsuitable material, as indicated in Section 02217, Article 3.2-b, the Contractor shall over-excavate and replace with bedding material as required and authorized by the Engineer. The quantity of unsuitable material will be measured from the bottom outside of the pipe.

B. Should ledge be encountered, it shall be removed to a depth of 6-inch below the bottom of the pipe, and replaced with bedding material.

3.04 CUTTING PIPE

A. All ductile iron pipe and PVC shall be cut using abrasive wheel cutter, rotary wheel hand cutter (with carbide cutter) or a guillotine pipe saw. All cuts shall be square and even with no ragged rough ends.

B. Field cut pipe lengths shall be beveled and filed to avoid damage to the gasket and facilitate making the joint.

C. When the cut end of pipe is to be used as a joint, the outside of the cut end shall be tapered back about 1/8-inch at an angle of about 30 degrees with the center line of the pipe. This shall be done with a coarse file or a portable grinder.

3.05 TEMPORARY PLUGS

A. When pipelaying is not in progress, the openings of pipes shall be closed by mechanical joint cap or approved equal as reviewed by the Owner.

3.06 RETAINER GLANDS

A. Install retainer glands on all mechanical joints of fittings, valves and hydrants.

3.07 POLYETHYLENE ENCASEMENT

A. Tube type polyethylene encasement shall be installed on all ductile iron pipe and fittings in accordance with AWWA Standard C105 - latest revision, Method A. Circumferential wraps of tape or plastic tie straps shall be placed at 2-ft. intervals along the barrel of the pipe.

B. The polyethylene encasement shall prevent contact between the pipe and the surrounding backfill and bedding material but is not intended to be a completely airtight or watertight enclosure. All lumps of clay, mud, cinders, and so forth, on the pipe surface shall be removed prior to installation of the polyethylene encasement. During installation, care shall be exercised to prevent soil or embankment material from becoming trapped between the pipe and the polyethylene.

C. The polyethylene film shall be fitted to the contour of the pipe to affect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack shall be provided in contouring to prevent stretching the polyethylene where it bridges irregular surfaces, such as bell-spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene due to backfilling operations. Overlaps and ends shall be secured with adhesive tape, string, plastic tie straps, or any other material capable of holding the polyethylene encasement in place until backfilling operations are complete.

3.08 VALVE BOX INSTALLATION

A. Valve boxes shall be installed centered on the valve.

B. Valve boxes shall be installed level such that the valve may be operated when the trench is back-fill and when pavement is installed.

C. Valve box top and bottom sections shall have a minimum of six (6) inches of overlap between the two sections when installed.

D. Contractor shall determine the length of valve box top and bottom sections based on field conditions (e.g., if the valve is installed deeper than the plan due to a utility conflict, a taller top or bottom section may be required).

1. Multiple valve box bottom sections may not be stacked to provide sufficient height.

3.09 TAPPING SADDLE INSTALLATION

A. DUCTILE IRON & CAST IRON MAIN REQUIREMENTS

1. Service saddles shall be used for all new 1.5-inch and 2-inch services on ductile iron water mains.

2. Service saddles shall be used for all 2-inch non-service connections to existing ductile iron or cast iron water mains (e.g., temporary main connections).

B. PVC MAIN REQUIREMENTS

1. 2-INCH MAINS

a. Service saddles shall be required for all new 3/4-inch and 1-inch services tapped on PVC mains.

2. 4-INCH AND GREATER MAINS

    a. Service saddles shall be required for all new 1-inch services tapped against a pressurized PVC main.

    b. Service saddles shall not be required for new 1-inch service taps against non-pressurized PVC mains.

    c. Service saddles shall be required for all new 1.5-inch and 2-inch services on PVC mains.

    d. Service saddles shall be required for all 2-inch non-service connections to existing PVC mains (e.g., temporary main connections).

C. HDPE MAIN REQUIREMENTS

1. Service saddles shall be used for all new 1-inch, 1.5-inch, and 2-inch services on HDPE water mains.

2. Service saddles shall be used for all 2-inch non-service connections to existing HDPE mains (e.g., temporary main connections).

3.010 TRACER WIRE & MARKING TAPE INSTALLATION

A. Warning Tape

1. Install warning tape continuously along the PVC/HDPE water main. At ends of rolls and repairs, splice tape with 3-foot overlap connected with duct tape. Tape should be installed at a depth of two (2) feet above the water main.

B. Tracer Wire

1. Install tracer wire continuously between each end of the PVC/HDPE water mains. It shall be installed in the same trench as the pipe and secured to the pipe as required to ensure the wire remains adjacent to the pipe.

2. Tracer wire shall be grounded at all ends of the wire by connecting the wire to an approved waterproof connection to a grounding anode, buried at the same depth as the tracer wire.

3. Tracer wire shall be installed up through a valve box at each end of the PVC/HDPE water main. The wire shall accessible by hand from the surface, and shall be installed with enough slack to allow for adjustments to the elevation of the valve box for paving.

    a. At the point of connection between existing conductive pipes where there is not a valve box installed, the tracer wire shall not be connected to the iron pipe.

3.011 TRACER WIRE TESTING

A. After trench backfill is completed, perform continuity and trace tests on all tracer wire in the presence of the Owner. If the tracer wire is found to be not continuous after testing, the Contractor shall repair or replace the failed segment of wire. The Contractor shall be responsible for all costs to confirm, locate, and repair any breaks in the tracer wire identified during testing.

3.012 SERVICE BOXES INSTALLED IN SIDEWALKS OR DRIVEWAYS

A. All service boxes installed in a sidewalk, driveway, or otherwise drivable surface regardless of material, shall be installed in a valve box top section.

3.013 LARGE DIAMETER SERVICE/HYDRANT PIPING RESTRAINT

A. When installing larger diameter (4-inches and greater) ductile iron service and hydrant branch piping, all slip joints shall be installed with restrained joint gaskets.

3.014 MAINS INSTALLED WITHIN CASING PIPES

A. All mains installed within a large diameter casing pipe shall be installed with end seals and spacers within the casing. Spacing of the spacers shall be as outlined in the drawings.

-- END OF SECTION --

Section 02594

Pressure and Leakage Testing of Water Mains

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials, equipment, gages and related items necessary to complete all pressure and leakage tests of all ductile iron water mains.

1.02 SUBMITTALS

A. Submittals shall be provided by the Contractor to the Owner as outlined in Section 01300 for the following items related to the pressure and leakage testing of water mains as required by the specific project:

1. Plan for pressure testing installed water main. Plan shall include details related to where testing shall be performed (i.e., location of corporation tap(s)), what mains shall be tested, where temporary fixtures will be installed to facilitate testing (e.g., temporary blowoff), and what mains are proposed to be omitted from testing.

2. The plan shall outline how the Contractor will demonstrate that each individual main segment meets the leakage requirement outlined below.

PART 2 – PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 PRESSURE AND LEAKAGE TESTS

A. After the pipe has been laid and backfilled, it shall be pressure tested and tested for leakage in the presence of the Engineer and/or the Owner.

B. All tests shall be conducted at a time and in a manner to minimize as much as possible any interference with the operation of the existing water system. The Owner will supply all water necessary for testing and placing the lines in service. The Contractor shall supply all labor, materials and equipment necessary to make any necessary connections to the water system and to carry out the tests.

C. The Contractor shall excavate and provide a corporation tap for pressure and leak testing as directed by the Engineer. The Contractor is responsible for all work associated with the excavation, including proper trench protection, barricades, traffic control and proper backfilling and compaction upon successful completion of the test.

D. The pipe shall be slowly filled with water and all air expelled from the pipe. If permanent air vents are not located at all high points, Contractor shall install corporation stops at such high points to bleed off air as the line is filled with water.

E. A pressure test pump will be connected to the new main at the testing point. The pressure will be slowly increased to 150 psi and allowed to stabilize (+/-2.5 psi) for a minimum of 15 minutes.

F. A reservoir of potable water shall be connected to the test pump and the initial level of water recorded.

G. The pump pressure shall be maintained at 150 psi for one hour with all make up water withdrawn from the reservoir.

H. After one hour, the water level in the reservoir will be measured and the volume of water drawn from the reservoir calculated and compared with the following allowable leakage:

$$\text{Allowable Leakage (gallons per hour)} = \frac{[\text{Pipe Length (feet)}] \text{ X } [\text{ Nominal Diameter (inches)}]}{12{,}084^*}$$

**Correct only for 150 psi test pressure*

I. If any test discloses leakage greater than that specified above, the Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance.

J. Final acceptance of the lines will not occur until satisfactory tests have been passed.

-- END OF SECTION --

Section 02595

Disinfection of Water Mains

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials, equipment, and incidentals necessary to disinfect the distribution system.

B. Do not disinfect water mains until pressure and leakage testing is completed, see Section 02594.

1.02 SUBMITTALS

A. Submittals shall be provided by the Contractor to the Owner as outlined in Section 01300 for the following items related to the disinfection of water mains as required by the specific project:

1. Plan for disinfecting installed water main. Plan shall include details related to where chlorine shall be injected (i.e., location of corporation tap(s)), what disinfection product will be used, method of de-chlorination, what mains shall be disinfected, where temporary fixtures will be installed to facilitate disinfection (e.g., temporary blowoff), and what mains are proposed to be omitted from disinfection.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The Contractor shall chlorinate the new main in accordance with the continuous feed method specified in Section 5.2 of AWWA Standard C651-latest revision, using 5% to 15% sodium hypochlorite solution.

PART 3 - EXECUTION

3.01 DISINFECTION

A. Upon satisfactory completion of the pressure and leak test, all new water mains shall be disinfected before they are placed into service in accordance with Section 5.2 of AWWA Standard C651-latest revision and the procedures specified herein.

3.02 FLUSHING

A. Section of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe. If no hydrant is installed at the end of the main, then a suitably sized tap should be provided.

B. All taps required by the Contractor for chlorination or flushing purposes, or for temporary release of air, shall be provided by him as part of the construction of the water main.

C. Flushing shall proceed for at a flow velocity of 2.5 feet per second (where practical) for a time to be determined by the Owner.

1. Practicality of reaching 2.5 feet per second shall be judged by the Owner based on the existing topography, pipe network, and the realistic ability of the area to receive and disperse the require flow rate without causing damage.

2. Contractor is responsible for the dispersion of water required for flushing such that is does not cause any damage to the surrounding area. Flow may be directed toward publicly owned drain manholes, catch basins, or sewer manholes if available. Contractor may not place a hose that is conveying flow directly into a publicly owned drain manhole, catch basin, or sewer manhole. Contractor shall coordinate with the public authority having jurisdiction over the receiving system prior to discharge.

D. Chlorine residual of water being flushed from the pipe must be reduced to zero. Contractor shall utilize a de-chlorination agent as recommended by the manufacturer.

3.03 REQUIREMENTS OF CHLORINE

A. Before being placed into service, the main shall be chlorinated so that a chlorine residual of not less than 10 parts per million remains in the water after standing 24 hours in the pipe. Chlorine residual at start of test shall be 25 parts per million.

3.04 POINT OF APPLICATION

A. The preferred point of application of the chlorinating agent is at the beginning of the pipeline or any valved section of it and through a corporation stop inserted in the pipe. The water injector for delivering the chlorine solution water into the pipe should be supplied from a tap made on the non-pressure side of the gate valve controlling the flow into the pipeline extension. Alternate points of application may be used when accepted or directed by the Engineer.

3.05 RATE OF APPLICATION

A. Water from the distribution system, or other source of supply as accepted by the Engineer, shall be controlled to flow very slowly into the newly laid pipeline during application of the chlorine. The rate of chlorine mixture flow shall be in such proportion to the rate of water entering the newly laid pipe that the dosage applied to the water will be sufficient at achieve 25 parts per million unless otherwise directed by the Engineer.

3.06 PREVENTING REVERSE FLOW

A. Valves shall be operated by the Owner so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Check valves may be used, if desired.

3.07 RETENTION PERIOD

A. Treated water shall be retained in the pipe for 24 hours +/- 4 hours. After this period, the chlorine residual at pipe extremities and at other representative points shall be at least 10 parts per million.

3.08 CHLORINATING VALVES AND HYDRANTS

A. In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent and under normal operating pressure.

3.09 FINAL FLUSHING AND TESTING

A. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its length shows, upon tests, that the residual chlorine is not in excess of that to be carried in the system.

B. After flushing, water samples collected from the treated piping system as directed by the Engineer, shall show satisfactory bacteriological results. Bacteriological analyses shall be performed by the Owner.

C. Chlorine residual of water being flushed from the newly laid pipe following chlorination must be reduced to zero. Contractor shall utilize a de-chlorination agent as recommended by the manufacturer.

3.10 REPETITION OF FLUSHING AND RESULTS

A. If the initial disinfection and flushing fail to produce satisfactory analytical results, the main shall be reflushed and resampled. If check samples show the presence of coliform organisms, then the main shall be rechlorinated by the Contractor using the continuous feed method of chlorination. If the second rechlorination attempt fails to produce satisfactory analytical results, the Contractor shall submit a plan to achieve passing results for PWD review and approval; remedies shall include but are not limited to pigging or replacement of pipe.

-- END OF SECTION --

SPECIAL PROVISION
SECTION 656
TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL
(Sewer Construction Dewatering)

The provisions of the 2020 Standard Specifications with the following additions shall apply:

656.01 Description

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Design, provide, install, maintain operate and remove temporary construction dewatering systems as required to control groundwater levels during construction of the sewer work; dispose of pumped water; constructing, maintaining, observing, and, removing of equipment and instrumentation for control of the system.

2. Furnish, install, operate, and maintain dewatering equipment and systems as required to provide stable subgrades and dry excavations.

1.02 PRICE AND PAYMENT PROCEDURES

Measurement and payment requirements: per Division 100 General Conditions.

1.03 REFERENCES

A. Reference Standards

1. Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES)

B. Definitions

1. *Normal Dewatering* is defined as using conventional pumps installed in open excavations, ditches, or sumps to control water and allow for installation of the pipe in a dry trench.

2. *Special Dewatering* is defined as installing wellpoints, deep wells, or eductor and ejector systems to control groundwater and hydrostatic pressures to allow for installation of the work. Special dewatering includes design of the dewatering system by a Professional Engineer registered in the state where the Project is located in good standing, and conducting additional borings or subsurface explorations deemed necessary by the Contractor, and approved by the Engineer, to support design.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: per Division per Division 100 General Conditions.

1. Coordinate dewatering work with trenching operations, support of excavation systems, and excavation, as necessary.

B. Pre-installation Conference: Conduct conference at Project site at least 30 days prior to the start of dewatering activities.

1. At a minimum, pre-installation conference shall be attended by the Owner, Engineer, Contractor’s Superintendent, support of excavation Installer, and dewatering Installer.

2. Verify availability of dewatering Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review condition of site to be dewatered including coordination with temporary erosion-control measures and temporary controls and protections.

4. Review proposed site clearing and excavations. Confirm coordination with the earth support system and trench excavation activities.

5. Review requirements for observation, testing, and monitoring of dewatering system.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 General Requirements.

B. Approved NPDES Dewatering General Permit (DGP)

C. Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions

D. Qualifications for Installer and designer

E. Dewatering Plan

1. Submit plan prepared, signed, and sealed by a qualified designer registered in the state where Project is located at least 45 calendar days prior to commencement of the dewatering Work.

2. Minimum contents of Dewatering Plan

    a. Plans and description of the Normal and/or Special Dewatering systems, including the number, location and depth of wells, wellpoints or sumps; designs of filters to prevent pumping of fine soil; method and location for filtering, sedimentation tanks and legal disposal of pumped water; and flow capacity of proposed system, accounting for groundwater level relative to tide cycles if applicable

    b. Design calculations and analysis data demonstrating the adequacy of the proposed dewatering system and its compliance with the performance requirements specified including calculations to estimate the quantity of discharge and calculations addressing excavation base stability and uplift

    c. Local Best Management Practices for the dewatering system conditions

    d. Plans, elevations, sections, and details

    e. Arrangement, locations, and details of sumps, well points, deep wells, ditches; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

    f. Location of the discharge points and the method by which effluent will be conveyed.

    g. Complete description of equipment and materials to be used, and the procedure to be followed for installation, operation, and maintenance in relation to the proposed sequence of excavation and backfilling.

    h. Methods to be used for drilling, construction, and development of dewatering wells

    i. Locations of observation wells

    j. Standby equipment and standby power supply with contingency plan for the loss of power to the dewatering system

    k. Proposed locations of points of effluent treatment equipment, effluent flow equalization tanks, if any, and discharge of water

    l. Discharge metering and reading schedules and details of settling tank and oil/water separator

m. Forms proposed for use during inspection and monitoring of the dewatering system

n. Sequence of installation coordinated with support of excavation system, and grouting work, as necessary.

F. Treatment System Plan

1. Submit treatment system Plan prepared, signed, and sealed, by a qualified designer registered in the state where Project is located.

2. Provide treatment system design and operating plan capable of meeting permit requirements (including NPDES DGP) prior to system installation and start-up which includes the following.

a. Layout drawings and site location plan including equipment sizes and capacities.

b. Operating plan including monitoring and maintenance schedule, screening and sampling program, and reporting schedule. The screening and sampling program shall, at a minimum, meet the sampling requirements of the NPDES DGP

c. Name of DEP-certified laboratory used for analyzing dewatering influent and effluent samples in accordance with the NPDES DGP

d. Stamps and signatures by licensed professionals for the design of the treatment system

e. Type of flow meter to measure volume of treated water discharged from the treatment system including calibration plan and methods

3. Treatment system discharge flow meter calibration records and flow readings

4. Laboratory results of dewatering influent and effluent samples

G. Field Quality Control

1. Average flow rate and time of operation of each pump used in the dewatering system on a daily basis during the period the dewatering system is in operation on form approved by the Engineer

2. Volume stored in frac tanks and volume disposed of

3. Reports of observations, field reports, including flow rate and groundwater level monitoring and daily field observation/inspection reports

H. Closeout and Maintenance Material Submittals: per Division 100 General Conditions.

1. Locations and depths of decommissioned wells and/or well points and other abandoned-in-place dewatering equipment

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 100 General Conditions.

B. Qualifications

1. Installer: specialized in dewatering work continuously for at least 5 years in similar subsurface conditions.

2. Designer: professional civil/geotechnical engineer registered in the state where Project is located having a minimum 5 years' experience and successfully designing dewatering systems in similar conditions.

a. For *Special Dewatering*, retain the services of a professional engineer registered in the state where Project is located who is in good standing and experienced in design of dewatering systems, to independently evaluate the boring logs and other soils information available to determine those areas that will require special dewatering techniques and to design the required system.

b. Contractor's dewatering professional engineer shall provide sufficient on-Site inspection and supervision to ensure that the dewatering is carried out in accordance with the approved design.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 100 General Conditions.

1.08 SITE CONDITIONS

A. Existing Conditions: per Division 100 General Conditions.

1. Review geotechnical and subsurface information provided with Contract Documents.

2. Determine if additional test borings are required and conduct other exploratory operations necessary for dewatering according to the performance requirements at no additional cost to Owner.

3. Prior to start of any construction activity jointly inspect the Site with dewatering Installer, Owner and Engineer to observe and document the preconstruction condition of the site, existing structures, and facilities.

PART 2 – PRODUCTS

2.01 DEWATERING SYSTEM

A. Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control groundwater levels and to lower, control, remove, treat, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.

1. Design dewatering system(s), including comprehensive engineering analysis by a qualified professional engineer, registered in the state where Project is located, using performance requirements and criteria indicated.

2. Design dewatering system to:

    a. Lower groundwater level within the Work area without adversely affecting existing structures, utilities, pavements, sidewalks or wells outside of the Work area;

    b. Maintain groundwater levels inside the excavation at a minimum of 2 feet below the bottom of excavation and groundwater drawdown at a distance of 15 feet outside the excavation limited to no more than 5 feet. Continuously monitor groundwater levels inside and outside the excavation;

    c. Effectively reducing the hydrostatic pressure below excavation subgrade in the existing fills, organic peat, organic and inorganic silts/clays and sands and gravel, so that excavation bottoms are firm and dry and a factor of safety of at least 1.2 is maintained against uplift; and

    d. Be capable of maintaining a dry and stable subgrade until the structures, pipes, appurtenances, and drainage pipe and structure bedding to be built therein have been completed to the extent that structures, pipes, and appurtenances will not be floated or otherwise damaged.

3. Basis of Design

    a. Existing groundwater levels measured at the Site as reported in the geotechnical and subsurface information.

    b. Based on the variability of thicknesses and discontinuous nature of cohesive soil strata encountered, pressure relief wells may be required to prevent uplift of these cohesive strata during excavation and dewatering for installation of underground systems. Reduction of the extent of dewatering may be accomplished by installing a temporary cutoff such as steel sheet piling.

c. On-Site recharge of dewatering effluent is the preferred method for disposal. Review available geotechnical and subsurface information to identify those areas where the presence of low permeability soils may require storage in sedimentation tanks and/or transport of the dewatering effluent. Disposal of effluent within 100 feet of buildings is prohibited.

d. Locate groundwater control facilities where they will not interfere with the Work or the work of other contracts.

e. Provide for prevention of surface water from entering excavations by grading, dikes, or other means.

f. Provide for dewatering without damaging adjacent streets, utilities, existing buildings, structures, and site improvements adjacent to excavation.

g. Minimum capacity of back-up equipment for the dewatering system: equal to the primary equipment and available in operating condition continuously. Provide electrically operated dewatering equipment, powered with independent generators adequately sized to operate the dewatering system and capable of running on commercial power. Provide standby equipment independent of commercial power and provide for dewatering within 24 hours upon primary pump or power failure.

h. Materials and equipment: in compliance with accepted industry standards, in good operating condition, and able to perform satisfactorily over the required duration of construction dewatering, including pipes, well screens, filter sand, grout, pumps, meters, and controls.

B. Provide units/equipment in accordance with approved Dewatering Plan.

1. Provide electrically operated dewatering equipment, powered with dedicated generators adequately sized to operate the dewatering system and capable of running on commercial power. Provide standby equipment independent of commercial power and provide for dewatering within 24 hours upon primary pump or power failure. No work shall be performed by the Contractor below the pre-construction groundwater level during dewatering system failure.

2. Provide suitable temporary pipes, flumes or channels for water that may flow along or across the Site of the Work.

C. Provide dewatering equipment with noise attenuation systems capable of meeting the governing noise regulation requirements.

2.02 TREATMENT SYSTEM

A. Provide units/equipment in accordance with approved treatment system.

B. Include properly sized and designed fractionation tank(s) with bag filtration system.

C. Provide additional storage units to handle quantities of water in excess of treatment system capacity to allow Work to proceed without interruption.

D. Provide flow meter at discharge locations to allow accurate measurement of flow rate and cumulative flow volume.

2.03 SOURCE QUALITY CONTROL

A. Provide in accordance with Division 100 General Conditions.

PART 3 – EXECUTION

3.01 GENERAL

A. Obtain necessary regulatory approvals and permits for operation of the dewatering system and the disposal of dewatering flows, including, among others, approval by under NPDES program for construction dewatering activities. Prepare and obtain the NPDES DGP.

B. Maintain dewatering operations to ensure erosion control, stability of excavations, prevention of uplift, prevention of flooding in excavation, and prevention of damage to subgrades and adjacent structures. Make modifications to the dewatering system and/or operations if required performance is not met at no additional cost to the Owner.

C. Do not perform Work below the pre-construction groundwater level during dewatering system failure.

D. Do not use dewatering pumps on Site without factory installed sound attenuating equipment.

E. Perform Work in accordance with approved Dewatering Plan.

3.02 INSTALLATION

A. Furnish, install, operate, and maintain dewatering equipment and systems as required to provide stable subgrades and dry excavations, including but not limited to the following.

1. Construction dewatering at all typical open-trench excavations along the sanitary sewer pipe alignments and associated structures

B. 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 groundwater 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.

C. Install dewatering system within limit of Work. Minimize interference with roads, streets, walks, and other adjacent occupied and used facilities. 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. Do not operate equipment on paved surfaces to prevent damaging these surfaces.

D. Locate dewatering facilities to prevent interference with utilities and construction work to be done by others.

E. Provide temporary grading to facilitate dewatering and control of surface water.

F. Install dewatering system utilizing sumps, wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material, valves, appurtenances, water disposal, and surface-water controls as indicated on approved Dewatering Plan.

1. Space sumps, well points or wells at intervals required to provide sufficient dewatering.

2. Use filters or other means to prevent loss of fine sands or silts during dewatering activity.

G. Provide system to lower and control groundwater to permit excavation and construction in the dry for open-cut excavation and excavation inside sheeting. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of carrying pipes and casings.

H. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

I. 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. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged utilities, structures, foundation soils, and other facilities at no additional expense to Owner.

J. Be prepared to modify the dewatering system and methods as required by actual field conditions encountered during construction, at no additional cost to the Owner.

K. Monitor quality of discharge from dewatering system to determine if soil particles are being removed from the system.

1. Encapsulate the suction end of the pump with crushed stone, filter fabric, and other materials to minimize the amount of silt discharged to the amount allowed by the construction dewatering permit.

    a. For dewatering operations with relatively minor flows, direct pump discharges using filtration bag or system per erosion and sediment control requirements, or pump into hay bale sedimentation traps lined with filter fabric. Filter water through the hay bales and filter fabric prior to seepage into storm drainage or any natural water course.

    b. For dewatering operations with larger flows, provide pump discharges into a steel dewatering/sedimentation basin. Use steel baffle plates to slow water velocities, to increase the contact time, and allow adequate settlement of sediment prior to discharge into waterways, storm drainage or discharge point allowed by the construction dewatering permit.

    c. Utilize silt sacks in catch basins when excess silt is suspended in the discharge water per erosion and sediment control requirements. If siltation basin is used, size to effectively filter for the volume and discharge rate of water anticipated without overflow.

L. Take measures to prevent damage to adjacent buildings, structures, utility lines, and work resulting from groundwater pumping.

M. Modify system if, after installation and while in operation, it causes or threatens to cause damage to existing buildings, structures, utilities, or facilities.

N. Repair damage, disruption, or interference resulting directly or indirectly from dewatering operations as approved by its Engineer.

O. Special Dewatering

1. Use *Special Dewatering* as necessary if *Normal Dewatering* methods are inadequate to ensure dry and stable excavation subgrade conditions.

2. *Special Dewatering* techniques may consist of one- or two-stage wellpoint systems, deep wells, or eductor and ejector type systems. Design with suitable screens to prevent pumping of fines and to address specified Work Site conditions.

3. In areas requiring Special Dewatering, lower the groundwater level to a minimum of 2 feet below the existing fill and/or organic peat subgrades or to the excavation subgrade for organic silt/clay subgrades prior to any installation and maintain that groundwater level until excavation has been backfilled. Provide monitoring by Contractor's dewatering professional engineer.

4. Furnish materials and install at least 2 observation wells at each excavation area at locations proposed by the Contractor's dewatering professional engineer and reviewed and approved by Engineer.

3.03 OPERATIONS

A. Operate system continuously until proposed construction is completed and backfill materials have been placed or until dewatering is no longer required in accordance with the requirements of the Engineer and Owner and permits.

B. Monitor dewatering systems continuously.

C. Promptly repair damages to adjacent facilities caused by dewatering.

D. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of backfill materials on dry subgrades.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

2. Maintain groundwater water levels a minimum of 24 inches below bottom of excavation, inside the excavation.

3. Limit groundwater drawdown outside the excavation to no more than 5 feet from preconstruction levels at a distance of 15 feet from the excavation.

E. Maintain a sufficient volume of water in the frac tanks to prevent oil, if present, from exiting the frac tank. Take steps to remediate oil released from the frac tanks.

F. Furnish, install, operate, maintain, and remove all necessary equipment to perform pH adjustments if required to meet the pH discharge limits required under the NPDES DGP.

G. Sample and analyze the dewatering influent and effluent to meet system maintenance requirements and the NPDES DGP requirements.

H. Meet standards and requirements of the NPDES DGP.

I. Include any other items incidental to the placement on Site, operation, maintenance, disconnection, dismantling, and removal of the treatment system.

J. Report any sign of subgrade disturbance due to seepage or unaccountable change in effluent flow rate to the Engineer and steps immediately taken to correct the condition.

K. Implement additional treatment and different permits if necessary and if sheen or oil is observed in the dewatering effluent.

L. Legally dispose of water removed by dewatering to avoid endangering public health, property, and portions of Work under construction or completed and legally dispose of sediment off Site at an appropriate disposal site.

3.04 MONITORING

A. Install an adequate number of observation wells to monitor the dewatering operations for the duration of the Work.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

3.05 PROTECTION

A. Protect and maintain dewatering system during dewatering operations.

B. Promptly repair damages to adjacent facilities caused by dewatering.

3.06 DECOMMISSIONING

A. Remove dewatering system from the Project Site upon completion of dewatering.

B. Unless otherwise directed by the Engineer, fill well holes with sand-cement grout and cut off wells a minimum of 24 inches below finished grade.

3.07 FIELD QUALITY CONTROL

A. Provide in accordance with Division 100 General Conditions.

3.08 CLOSEOUT ACTIVITIES

A. Provide in accordance with Division 100 General Conditions.

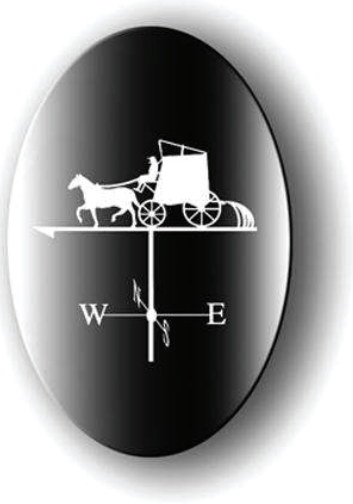
656.02 Method of Measurement

Construction dewatering activities specified in this Section, including applying for and acquiring and adhering to all required permits for the project, will not be measured.

656.03 Basis of Payment

Designing, installing, operating, maintaining, repairing, water treatment and disposal in accordance with all applicable permits, abandoning in place and removing the construction dewatering systems along the alignment will not be paid for separately and shall be considered incidental to the pay item number for the installation of the sewer pipe (Items 801.17, 801.175, 801.184, 801.19, 801.191).

SECTION V: Work Associated With Sewer Construction



A. GENERAL

1. PROJECT COORDINATION

The District provides wastewater collection, interception, and treatment services under a Charter and/or Agreements with its Member Municipalities. In general, the District will accept additional sewerage infrastructure when designed in accordance to State/Local Code, general engineering practice, and published District Standards and Details. This specification includes limited District standards intended to convey the general nature and quality of acceptable infrastructure.

All project submittals shall include a detailed design documenting the basis for the selection, sizing, and general design of the infrastructure. This shall include, at a minimum, the number of units and expected flows, factors and assumptions used in sizing sewers, force mains, pump stations, and other infrastructure.

All project submittals shall include a detailed project schedule that clearly identifies the dates or timeframes associated with Planning Committee Submittals and Approvals, construct start dates, testing and start-up of infrastructure, acceptance by the District, and expected commissioning of systems.

The District reserves the right to recover costs associated with the review of any submittals, analysis of capacity to serve, inspection, and field-testing and start-up. Any fees will be in accordance with the fee schedule published in Part II – Work Associated with Water Line Construction A. 1.

The District will not accept or operate any infrastructure until the project has been completed and tested in accordance with any submittals and District Standards and Details. As-built drawings must be provided before any infrastructure will be accepted or operated by the District.

2. INSPECTION

An inspector from the District, a consultant working for the District, or an inspector retained by the local municipality (with responsibility for the oversight of sewerage infrastructure to be installed) will be assigned to each project to ensure that all work is completed and materials are installed in compliance with all submittals and these specifications. During the course of the work the inspector will report to the Engineering Supervisor on the progress of the work. The District, or its representative, before incorporation into the work, must approve any deviation from the approved plans or specifications.

The Contractor shall schedule with the District for inspection services a minimum of 3 working days prior to construction. The District cannot guarantee an inspector for the project without this notice. Start-up and acceptance testing of systems will require a 14 working day notice.

B. DESIGN CRITERIA

In general, the District will accept additional sewerage infrastructure when designed in accordance to State/Local Code, general engineering practice, and published District Standards and Details. This specification includes limited District standards intended to convey the general nature and quality of acceptable infrastructure.

C. STANDARD SPECIFICATIONS AND DETAILS

1. SEWERS AND DRAINS

PART 1 GENERAL

1.01 This section shall define the standards associated with the following:

a. Sanitary sewer pipe

b. Forcemain pipe
c. House service pipes
d. Storm sewer pipe

1.02 RELATED WORK:

1.03 SUBMITTALS:

A. Manufacturer's product data and installation instructions.

B. Certified copies of tests on pipe units.

C. Construction Records: Record depth and location of the following:

1. House service capped ends, cleanouts, bends in house service, connection points to sewer main.
2. Bends, thrust blocks in force mains.
3. Repairs to existing pipes.

Record neatly in a permanently bound notebook and submit at Substantial Completion. Provide access to records for the District at all times. Submit copies to the District on a weekly basis.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS:

A. General: Provide fittings of same type and class of materials as pipe. Provide commercially manufactured wyes or tee/wyes for service connections. Fitting must have single piece gasket.

B. PVC Non-Pressure Pipe and House Services (Sewer): 4" through 12" Diameter: ASTM D3034 or ASTM D3033, strength requirement SDR 35; push-on joints, ASTM D3212; gaskets, ASTM F477.

C. PVC Pressure Pipe (Forcemain):

1. Less than 3" Diameter: Must be approved by PWD prior to approval

2. Less than 4" Diameter: ASTM D2441, strength requirement SDR 21; push-on joints, ASTM D3139; gaskets, ASTM F477.

3. 4" Diameter and Larger: ASTM D2241, Class 150, strength requirement DR 18, with cast iron pipe outside diameters; push-on joints, ASTM D3132; gaskets, ASTM F477. All fittings to be ductile iron mechanical joint, AWWA C110 with 250 psi minimum pressure rating.

D. Storm Sewer Pipe: Polyethylene drainage pipe with corrugated exterior and smooth wall interior, highway grade, AASHTO M252, ASTM F405, by American Drainage Systems, or approved equal.

E. Reinforced Concrete Pipe: ASTM C76; Class IV, O-ring gasket joints with rubber gaskets, meeting MDOT specifications.

F. Ductile Iron Pipe: AWWA C151; thickness Class 52 AWWA C150; double cement lined, AWWA C104; push-on joints or mechanical joints with rubber gaskets, AWWA C111; fittings, AWWA C110.

G. Underdrain: Perforated, corrugated polyethylene pipe with smooth wall interior, AASHTO M252, ASTM F405, by American Drainage Systems, or approved equal.

2.02 MISCELLANEOUS:

A. Flexible Couplings: Use and location shall be approved by the District.

1. Type A: Dresser Style 53 as manufactured by Dresser, or approved equal.

2. Type B: Neoprene sleeve with stainless steel bands by Fernco, or approved equal.

B. Pipe Supports: Saddle type, steel, painted, adjustable, by ITT Grinnell, or approved equal.

C. Geotextile Fabric: Propex 4508 by Amoco Fabrics Co., or approved equal.

D. Forcemain Marking Tape: Lineguard III by Tri-Sales, Inc., 2" wide, green; detectable with magnetic locators, or approved equal.

E. Rigid Insulation: Extruded closed-cell rigid foamed polystyrene, 2 inch thickness, width of trench, Styrofoam HI-60, by Dow Chemical, or approved equal.

F. Air and Vacuum Valves:

1. Construction: Cast iron body and cover, ASTM A126; Stainless steel concave float, ASTM A240 T304; Stainless steel float stem, ASTM A581 T303; Buna-N needle and seat; Brass plug, ASTM B124. Operating pressure from 0 to 150 psi.

2. Outlet: 1-inch diameter. Provide a short nipple and a return elbow with piping as shown on the Drawings.

3. Inlet: 2-inch diameter. Provide taps, piping and valves as shown on the Drawing.

4. Coating: Red oxide phenolic primer paint.

5. Model: ACO 443 Sewage Combination Air Valve as manufactured by Valve and Primer Corporation, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF GRAVITY PIPE AND FITTINGS:

A. Methods: Install in accordance with manufacturer's recommendations. Use a laser beam for line and grade unless otherwise permitted by the District. Secure each length of pipe with bedding before placing next length. Plug open ends when work is suspended. Bed pipe as shown on Drawings. A 30-inch minimum

cover over the top of PVC pipe and DIP pipe should be provided before the trench is wheel-loaded.

B. Grade and Line:

1. Grade and Line shall be sufficient to provide minimum velocities of 2.0 fps. Lay pipe to line and grade shown on the Drawings as reviewed and approved by the District. If grade is not shown, determine elevations of start and finish points for each run of pipe. Lay pipe to a uniform grade between these points.

2. Line and grade may be adjusted as approved by the District, when required by field conditions.

C. Conditions: Lay pipe in the dry. Do not use installed pipe to remove water from work area.

D. Flush and clean all pipe and remove all debris and materials. Flushing and cleaning methods shall be in accordance to District Standards and approved by the District. Gravity flushing is not acceptable.

E. Connections to Manholes and Catch Basins: Any connections shall be in accordance with District Standards. Connections to existing wastewater manholes and catch basins shall be performed under PWD Inspection. Connections shall be cored as opposed to being drilled/chiseled. Connections to existing structures must not result in additional infiltration. Any joints shall be located within 3 feet of inside surface of manholes and catch basins.

F. House Service Fittings and Leads:

1. Size of service leads 4" unless otherwise indicated.

2. Depth and location of service to be determined in field, as approved by the District.

3. Provide tee/wye or wye fittings on main line pipe. Extend services to a edge of Right-of-Way as determined by the District.

4. Provide clean outs as required.

5. Plug, or cap, and stake ends of new service. Provide stake that extends from plug or cap to 1 foot above ground surface. Provide the District with measurements of pipe installed and in obtaining swing ties to ends of leads.

6. All service connections must be shown on as-built drawings.

7. No residential service connections shall be allowed to tie into District owned sewer force mains.

3.02 INSTALLATION OF FORCEMAINS AND PRESSURE PIPE:

A. Grade and Line: Lay pipe to line and grade as approved by the District. Do not allow positive-negative grade discontinuities. See Article 3.01 B above.

B. Methods, Conditions, and Connections to Manholes: See Articles 3.01 above.

C. Install warning tape continuously from the pump stations to the end of each force main. At ends of rolls and repairs, splice tape with 3-foot overlap connected with duct tape. Supply the District with one full roll for future repairs. Extend to grade of each manhole and at pump stations.

D. Thrust Protection: Provide thrust protection at all bends in forcemains in accordance with Standards and as approved by the District.

E. Terminus: Forcemains shall terminate in manholes prior to connecting to District owned sewer mains.

3.03 UTILITIES TO BE ABANDONED: Close open ends of abandoned underground utilities that are not indicated to be removed. Provide sufficiently strong closures, such as caps or brick and mortar, acceptable to the District to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed. CONTRACTOR may remove abandoned utilities with written permission of the District or Town.

3.04 INSULATION:

A. Install as shown on approved Drawings.

B. Provide 2-inch minimum thickness for sewer, forcemain, and water main, compacted sand layers directly above and below insulation.

3.05 TESTING OF SANITARY SEWERS:

A. General: Test all sanitary sewer pipes after backfilling. Install all house service leads on main line before testing. Perform tests in presence of the District. A maximum of 1000 feet of pipe may be installed but not tested at any time.

B. Gravity Sewer Leakage Tests: Use low pressure air test as follows:

1. Plug ends of section to be tested.

2. Supply air slowly to the pipe to be tested until the air pressure inside the pipe is 4.0 psi greater than the average back pressure of any groundwater submerging the pipe.

3. Disconnect air supply and allow a minimum of two minutes for stabilization of pressure.

4. Following stabilization period measure drop in pressure over the test period within the following times:

Nominal Pipe Size (in.)	Test Period (min.)
4	4
6	4
8	6
10	6
12	7
15	8
18	9

21	11
24	13

5. Acceptable drop: No more than 1.0 psi.

C. Forcemain and Pressure Sewer Tests: Use hydrostatic test as follows:

1. Fill section of pipe with water and expel all air.

2. Pressurize to 1.5 times the normal operating pressure but not less than 60 psi.

3. Measure leakage over a 2-hour test period.

4. Acceptable leakage: Less than 10 gallons per day per inch diameter per mile of pipe tested.

D. Deflection Test for PVC Gravity Sewer Pipe: Test 100% of pipe with "GO-NO-GO" gauge allowing maximum deflection per ASTM D3034, Appendix X1, Table X1.1.

E. TV Inspection: All sewers and drains shall be inspected by an approved CONTRACTOR using TV pipe inspection. Defects in materials and/or workmanship found during the inspection shall be corrected by the CONTRACTOR.

F. Repair and/or replace all pipes not passing tests, using materials and methods approved by the District, and retest.

2. MANHOLES/PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 This section defines the standards associated with the following:

1. Precast Manholes
2. Drop Manholes
3. Precast Wet Well and Valve Pit
4. Catch Basins
5. Inverts
6. Risers
7. Frames, Covers, and Grates

1.02 RELATED WORK:

1.03 QUALITY ASSURANCE:

A. General: Provide complete manhole and precast concrete structures capable of supporting AASHTO H20 loading. All precast concrete shall comply with ASTM C913 "Standard Specification for Precast Concrete Water and Wastewater Structures."

B. Precast Manhole and Catch Basin Components: Comply with ASTM C478.

C. Antifloatation Slab Design Certificate: The CONTRACTOR may provide the precast structures requiring antifloatation slabs as one complete unit. If provided as a monolithic unit, submit a certificate of design signed by a Professional Engineer registered in the State of Maine, certifying that the structure including the slab has been designed to withstand all forces including soil, traffic and hydrostatic in accordance with all applicable laws, regulations, rules and codes.

1.04 SUBMITTALS:

A. Shop Drawings: Submit for precast manholes and all precast concrete items. Show components to be used, elevations of top of precast sections, base and pipe inverts, location of pipe penetrations, steps, for each manhole. Verify finish grade elevation at each proposed manhole location in the field.

B. Product Data: Submit manufacturers' product data and installation instructions for frames, covers, grates, precast items, manhole sleeves, joint sealants, and frost barrier.

PART 2 - PRODUCTS

2.01 MANHOLES (INCLUDES WET WELL):

A. Base Sections: Precast monolithic construction with steps (no steps in wet well).

B. Barrel Sections: Precast with steps (no steps in wet well).

C. Top Sections: Precast eccentric cone with steps. Use flat cover for wet well, if shown on Drawings or approved by the District.

D. Steps: Polypropylene reinforced with steel rod. Meet OSHA requirements, minimum width 16". Cast into concrete.

E. Pipe to Manhole Connections:

1. Pipe diameter 6" or larger: Flexible manhole sleeves shall be CP series manufactured by Interpace Corp., or approved equal. Size to fit diameter and type of pipe without use of gaskets.

2. Pipe diameter less than 6": Thermoplastic pipe sleeve shall be Link-Seal Century Line Model CS100 by Thunderline Corp. with sleeve seal equal to "Link-Seal" by Thunderline Corp., or approved equal.

F. Joints Between Precast Sections: Watertight, shiplap-type seal with two rings of one-inch diameter butyl rubber sealant.

2.02 DROP AND VALVE MANHOLES:

A. General: Conform to requirements for manholes. Provide pipe and accessories as shown on Drawings.

B. Riser Support Bracket: 10 gauge, Type 304, No. 3 finish stainless steel.

2.03 CATCH BASINS:

A. Base Sections: Precast monolithic construction.

B. Barrel Sections: Precast monolithic construction.

C. Top Sections: Precast eccentric cone. Use flat cover for wet well, if shown on Drawings or approved by the District.

D. Joints Between Precast Sections: Watertight, shiplap-type seal with two rings of one-inch diameter butyl rubber sealant.

2.04 INVERTS:

A. 180 Degree Straight Through Manholes: One piece molded fiberglass invert with integral pipe connections that are factory precast integral with the manhole base, "Fiberliner 2000 Invert System" as manufactured by Fiberliner 2000 New England, Inc, Tel. (508) 349-7401; or approved equal.

B. Non Straight Through Manholes: One-piece plastic composite invert, "Reliner" as manufactured by Reliner – Duran, Inc. Tel. (860) 434-0277; or approved equal. Provide concrete backfill with brick table.

1. Concrete: 3000 psi..

2. Sewer Brick: ASTM C32, Grade SS, hard brick.

3. Mortar: Type M, ASTM C270. Use Type II portland cement, Type S lime. Proportions for Mortar: 1 part portland cement, 1/4 part hydrated lime, 3 to 3 3/4 parts sand.

2.05 RISERS:

A. General: Rubber riser rings are preferred.

1. Rubber adjustment riser rings manufactured from a rubber fibrepolyurethane prepolymer composite, "Infra-Riser" as manufactured by GNR Technologies Inc., Tel. (514) 366-6116; or approved equal.

2. No more than 3 courses of brick may be used. Any work must be acceptable to the District.

2.06 FRAMES, COVERS, AND GRATES:

A. Material: Cast iron, ASTM A48 Class 30.

B. Manhole Frames and Covers: For manholes 6' or more in vertical height, use minimum 24" diameter opening. For manholes 6' or less in vertical height , use a min. 28" diameter opening. Weight of 350 pounds, labeled with "SEWER" in 3" high raised letters on cover for sewer manholes. Standard frames and covers shall be Model M267S by Etheridge Foundry, or approved equal.

C. Hatches: Hatches shall be equipped with heavy forged brass hinges, stainless steel hinge pins, spring operators, automatic hold open arm with release handle, 1/4" diamond plate cover and locking mechanism. Single leaf with grab bar Bilco Type J and double leaf with grab bar Bilco Type JD, or approved equal. Sizes as indicated on Drawings as approved by the District.

2.07 FLOOR BOXES: Floor boxes to be cast-in-place. Floor boxes to be constructed of cast iron with bronze bushings to preserve stem alignment, Clow Model F-5695, or approved equal.

2.08 MISCELLANEOUS:

A. Manhole Cover Lifting Tools: Provide two (2) cover lift lifting tools by Etheridge Foundry, or approved equal, compatible with manhole covers provided.

B. Frost Barrier: U.V. resistant, high grade polyethylene, minimum thickness six (6) mils.

C. Joint Sealants:

1. Butyl Rubber Sealant: One (1) inch diameter strips manufactured by Kent Seal, or approved equal.

2. Butyl Rubber Caulking: Conform to AASHTO M-198, Type B.

D. Sewer Manhole Inverts: Provide inverts as specified or as shown. Configuration to be as required by connecting pipes and as shown on Drawings.

PART 3 - EXECUTION:

3.01 INSTALLATION OF MANHOLES/PRECAST STRUCTURES:

A. Placement: Place precast bases and structures on compacted bedding material so bottom of structure is plumb and pipe inverts are at proper elevations. Place manhole barrel and top sections in the appropriate height combinations. Plug all lifting holes inside and out with non-shrink grout. Construct manhole inverts in accordance with specifications.

B. Joints: Follow manufacturers instructions for sealing joints between precast sections. Provide two rings of 1 inch diameter butyl rubber sealant. Point joints inside and out with butyl caulk.

C. Frame and Covers:

1. Set to final grade as shown on the Drawings and as specified. Provide adequate temporary covers to prevent accidental entry until final placement of frame and cover is made.

2. Use two rings of 1 inch diameter butyl rubber sealant between frame and rubber riser. Provide downward force to frame so as to compress the joint, provide a watertight seal, and prevent future settlement. Point compressed joint with butyl rubber caulk sealant.

3. Set manhole frames and covers to final grade only after pavement base course has been applied, or after final grading of gravel roads.

D. Inverts: As specified.

E. Steps: Replace any steps that are out of plumb and proper horizontal placement.

F. Frost Barriers: Wrap each manhole to the maximum excavation depth or not less than 6 feet below grade, with a minimum of four layers of 6 mils each of the polyethylene.

1. Clean manhole exterior of all dirt and remove any protrusions.

2. Apply a 6-inch wide vertical strip of bituminous waterproofing adhesive from the top of manhole to the greatest excavation depth, but not in excess of 6 feet.

3. Start poly wrap at adhesive strip and proceed around manhole continuously, overlapping adhesive strip a minimum of 24 inches on the final layer.

4. Tuck and pleat poly at top in a continuous manner, minimizing size of folds. Extend poly past top of manhole frame and temporarily tuck remainder inside frame, until final backfill and paving.

5. Paved areas: Cut poly flush with manhole rim after pavement is in place.

6. Unpaved areas: Pull loose ends of poly together, remove excess air and tie off end with galvanized wire. Bury with manhole below grade.

3.02 LEAKAGE TESTING - MANHOLES:

A. General: Tests must be observed by the District. Manholes must be complete, including backfill, for final test acceptance except for shelf and invert. Plug all pipes and other openings in the manhole walls prior to test.

B. Exfiltration Test:

1. Plug pipes into and out of MH and secure plugs.

2. Lower groundwater table (GWT) to below MH. Maintain GWT at this level throughout test. Provide means of determining GWT level at any time throughout test.

3. Fill MH with water to top of cone.

4. Allow a period of time for absorption (determined by CONTRACTOR).

5. Refill to top of cone.

6. Determine volume of leakage in an 8 hour (min) test period and calculate rate.

7. Acceptable leakage rate: Not more than 1 gallon per vertical foot per 24 hours.

8. The District reserves the right to require an infiltration test if the District is not satisfied with the exfiltration test.

C. Vacuum Test:

1. Manholes may be vacuum tested in lieu of the exfiltration test. The vacuumtests must be performed prior to backfilling the manhole, filling joints, and constructing the manhole inverts and benches. All pipe connections shall be made prior to the test.

2. Plug pipe openings and securely brace the plugs and pipe.

3. Set the tester onto the top section of the manhole and inflate the compression band to effect a seal between the structure and the vacuum base.

4. Connect the vacuum pump to the outlet port, open the valve, start the motor and draw a vacuum of 10" mercury.

5. Close the valve and monitor the vacuum gauge.

6. The test shall pass if the vacuum holds at 10" mercury or drops no lower than 9" within the following times:

Depth of Manhole (feet)	Time (min.)
0 - 10	3.0
10 - 15	3.5
15 - 20	4.0
20 - 25	4.5
>25	5.0

7. If the vacuum drops in excess of the prescribed rate, the CONTRACTOR shall locate the leak, make proper repairs, and retest the manhole.

8. If the unit fails the test after repair, the unit shall be water exfiltration tested.

3.03 REPAIRS:

A. Determine causes of all leaks and repair them. Perform earthwork required if manhole has been backfilled.

B. Perform repairs using methods and materials approved by the District. Remove and replace or reconstruct manhole if necessary. Remove and replace defective sections if required by the District.

SPECIAL PROVISION
SECTION 801
TEMPORARY SEWER BYPASS

The provisions of the 2020 Standard Specifications with the following additions shall apply:

801.01 Description

PART 1 – GENERAL

1.01 SUMMARY

A. Provide, operate, and maintain a functional bypass pumping system capable of bypassing each area of Work without leakage or spillage of sewage upon the ground or streets or back up of sewage into any building or onto any property for the duration of the Project.

B. Design Requirements:

1. Provide a bypass pumping plan designed by a professional engineer registered in the state where Project is located.

2. Provide a manhole-to-manhole bypass pumping setup.

3. Provide temporary bypass pumping adequate to handle dry weather and wet weather flows and to protect against surcharging of the existing system upstream of the Work area.

1.02 PRICE AND PAYMENT PROCEDURES

A. Measurement and payment requirements: per Division 100 General Conditions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Sequencing, and Scheduling: in accordance with Division 100 General Conditions.

1.04 SUBMITTALS

A. Submit in accordance with Division 100 General Conditions.

1. Bypass pumping plan for each bypass location, stamped by a professional engineer registered in the state in which the Project is located, prior to implementation and prior to the start of construction

2. Minimum contents of sewage bypass pumping plan:

a. Standard Operating Procedure: Describe the normal sequence of events to be followed while pumping and setting up and breaking down pumping equipment. Plan must address strategies and safeguards to ensure that public safety and environmental health is maintained at all times, the possibility of property damage and wetlands impacts, and overall level of inconvenience is minimized.

b. Layout drawing showing locations of equipment on Site and how access to the Site is maintained

c. Equipment lists

d. Pump curves and motor and engine data demonstrating equipment is sufficiently sized to meet all specified and anticipated operating conditions

e. Notification form

f. Emergency Response Plan: Describe the intended means of handling the following situations, including response and clean-up measures, and emergency backup power or backup fuel storage. List equipment to be used and where it will be stored.

- Break or failure of bypass line (pipe)
- Failure of bypass pump
- Overflow
- Back up into dwelling or onto private property
- Failure of bypass pumping system to accommodate flow

3. Shop Drawings for equipment and materials including, but not limited to:

- Pumps
- Engines and/or Motors
- Sound Enclosures
- Pipe or hose
- Joints/couplings
- Plugs and/or bladders

4. Statement of Qualifications demonstrating experience of the firm in accordance with Article 1.05 and listing a minimum of 20 successful bypass pumping projects conducted in the last ten years. Provide contact information for no fewer than 5 of these projects which:

    - Have been completed in the last 5 years,
    - Involved similar equipment to that proposed for this Project, and
    - Had duty capacities of not less than 1.5 MGD.

1.05 QUALITY ASSURANCE

A. Provide in accordance with Division 100 General Conditions.

B. Qualifications: per Division 100 General Conditions and as follows.

1. Bypass pumping system shall be provided, operated, and maintained by a firm which has been regularly engaged in providing bypass pumping for a minimum of 10 years.

1.06 SITE CONDITIONS

A. Existing Conditions: per Division 100 General Conditions.

B. The fluid to be pumped is raw sanitary wastewater which contains typical solids, rags, and debris. Flows are subject to typical diurnal variations and also increase during wet weather and high groundwater. Provide that the bypass pumping system is capable of handling all of these conditions.

C. Portions of the Project are subjected to infiltration and inflow. Account for infiltration and inflow volume in the planning and conduct of the Work.

D. Design flow for the bypass pumping plan basis of design: 0.9 MGD.

PART 2 – PRODUCTS

2.01 BYPASS PUMPING SYSTEM

A. Godwin Pumps (a Xylem brand)

B. Griffin Dewatering

C. Rain for Rent

D. Or equal

2.02 PUMPS, PIPES & FITTINGS

A. Provide pumps suitable for use with raw, unscreened sewage and capable of conveying the volume of flow anticipated with a sufficient margin of safety. Provide for 100 percent redundancy (2 pumps the Site for every 1 pump required) if flow cannot be returned to the sewer at any time if pumping system failure occurs.

1. Redundant pumping: suction and discharge piping with quick connect couplings to facilitate change out of pumps.

B. Pump Connections: quick connect couplings to facilitate change out of pumps

C. Pipe: carbon steel, fused high-density polyethylene pipe, or equal.

D. Joints: Victaulic or approved equal.

E. Fittings: quick-connect type.

F. Lay-flat hose: extra heavy duty, highly abrasion resistant, fitted with gasketed couplings, and rated for 150 percent of working pressure.

G. Provide sound attenuation enclosure for engines and pumps in accordance with state and local noise requirements.

H. Control: automatic level control for pumps. Redundant pump shall start automatically if one duty pump fails.

I. Autodialers: provide autodialers with capacity to call up to 3 different phone numbers upon low fuel and pump failure.

PART 3 – EXECUTION

3.01 GENERAL

A. Maintain flows under all flow conditions. Adequately handle flows, even instantaneous peak flows, without damage or overflow, providing for potential large instantaneous flow contributors connected to the sewer under repair.

B. Allow for passage of traffic and protect bypass piping at driveway and street crossings.

C. Coordinate bypass pumping with the Maine Yacht Center General Manager.

Brian Harris, General Manager
Phone: 207.842.9000
Email: brian@maineyacht.com

D. Coordinate bypassing with low-flow times to the extent possible. Prevent overflows or backups.

E. If Contractor determines bypass pumping is not required at a location due to lack of flow or determines that a Work item does not require bypass pumping to be performed, and Engineer agrees, protect flows from construction debris and ensure no debris enters the sewer system.

F. Repair damage to existing pipes and structures to the satisfaction of the Engineer.

G. Prevent sanitary flow from discharging into salt or fresh water body by means of overflow, bypass pumping, or other methods.

H. Restore normal service to entire system at end of normal working hours each day.

3.02 SHUTDOWN

A. Shutdown is not permitted. Maintain flow of wastewater at all times with no interruption of service.

3.03 TEMPORARY POWER

A. Provide fuel and power to run bypass pumps at no additional cost to Owner.

3.04 PIPING

A. Provide that piping system has adequate water tightness. Perform a leakage test with clean water at Engineer's direction, at no additional cost to Owner.

B. Lay temporary piping along the general lines of streets or roadways in a manner that causes the minimum amount of disruption and is least likely to be damaged. Use temporary bituminous pavement, cold patch, or other approved material to form a ramp on each side of the pipe or depress the pipe at driveways to allow for property owners to drive over the temporary pipe as directed by the Engineer.

3.05 OPERATION AND MAINTENANCE

A. Continuously monitor bypassing operations regardless of duration or timing of bypassing. Unattended bypass pumping is prohibited.

B. Arrange for bypass pumping past working hours with Engineer and provide adequate sound attenuation and an attendant.

C. Do not allow leaks in bypass pumping systems. Clean and disinfect leaks at no additional cost to Owner.

801.02 Method of Measurement

Temporary bypass will be measured for payment by the lump sum.

801.03 Basis of Payment

All costs and work associated with temporary bypass pumping included but not limited to all labor, materials, fuel, power, installation, maintenance, removal, and restoration after removal shall be included in the lump sum pay item.

Payment will be made under:

Pay Item		Pay Unit
801.071	Temporary Bypass Pumping	Lump Sum

SPECIAL PROVISION
SECTION 801
SEWER MAIN

The provisions of the 2020 Standard Specifications with the following additions shall apply:

801.01 Description

This work shall consist of the construction of sewer pipes by means of trenched installation and casing pipe, hereinafter referred to as "pipe" as shown on the Drawings, and specified herein. All sewer mains are to be installed in accordance with the Portland Water District specifications attached to this provision and found here:

https://www.pwd.org/sites/default/files/Section_V-Work_Associated_with_Sewer_Construction.pdf

Where noted on the Drawings, the Contractor shall use the specific pipe material indicated. For pipe buried with less than 4-feet of cover or more than 14-feet of cover the pipe shall be ASTM D2241 PVC standard dimension ratio (SDR) 21. Unavailable sizes shall be SDR26. For pipe buried with 4-feet to 14-feet of cover the pipe shall be ASTM D2241 PVC SDR 35.

801.02 Execution

The Contractor shall confirm the quantity and locations of sewer mains to be paid under this section with the Engineer prior to construction. All materials and installation shall be in accordance with the Portland Water District specifications, found at the location above, for the corresponding work items and incidental work.

801.03 Method of Measurement

SDR 21 PVC and SDR 35 PVC sewer pipe shall be measured by the linear foot measured along the horizontal projection of the centerline of the pipe from inside manhole face for the actual number of linear feet of pipe installed, including fittings.

801.04 Basis of Payment

The accepted quantities of pipe will be paid for at the contract unit price per linear foot, complete in place. Payment shall be full compensation for excavating, shoring and bracing, saw cutting, furnishing, handling, and installation of materials, testing, couplings, tree trimming, removing and replacing signs, pavement cutting, removal and disposal of pavement, clearing and grubbing, pipe bedding and blanket, marking tape, backfill and compaction, clay dams, wyes, ductile iron and/or PVC tees for chimneys, coring into existing manholes, bricking and bulkheading of existing pipe where noted on the plan, replacement of marked utility services, cleaning and flushing, dewatering, pipe, fittings, laying and jointing, testing, connections to existing mains that are remaining, insulation, post-installation CCTV inspection for all pipe segments completed, and associated work as specified and shown on the Drawings.

Payment shall be full compensation for all labor and materials for a complete installation.

Payment will be made under:

Pay Item		Pay Unit
801.17	8” PVC Sanitary Sewer (SDR-35)	Linear Foot
801.175	10” PVC Sanitary Sewer (SDR-21)	Linear Foot
801.184	12” PVC Sanitary Sewer (SDR-21)	Linear Foot
801.19	15” PVC Sanitary Sewer (SDR-35)	Linear Foot
801.191	15” PVC Sanitary Sewer (SDR-21)	Linear Foot

SPECIAL PROVISION
SECTION 803
SANITARY UTILITY SEWERAGE MANHOLES, FRAMES, AND COVERS

The provisions of the 2020 Standard Specifications with the following additions shall apply:

803.01 Description

This work shall furnish and install manholes, frames, and covers. All manholes and accessory items are to be furnished and installed in accordance with the Portland Water District specifications found here:

https://www.pwd.org/sites/default/files/Section_V-Work_Associated_with_Sewer_Construction.pdf

803.02 Execution

The Contractor shall confirm the quantity and locations of manholes to be paid under this section with the Engineer prior to construction. All materials and installation shall be in accordance with the Portland Water District specifications, found at the location above, for the corresponding work items and incidental work.

Perform exploratory test pits shown on Drawings and provide findings to Engineer a minimum of 1-week prior to commencing Work in respective area(s). For each test pit, submit a field report/notes containing photos, sketches, size, depth of test pit, size and depth of utilities encountered in test pit.

Conduct test pits and other utility research and properly restore utilities interfered with or damaged during construction at no cost to the Owner

Abandoned manholes shall be filled with flowable concrete fill. Geofill Low Density (LD) Cellular Concrete: May be used as an alternative in lieu of flowable concrete fill for pipe or other structure abandonment as shown on the Contract Drawings at no additional cost to the owner.

a. Portland cement shall comply with ASTM C150 (Type I, II, or III).
b. Fly ash: AASHTO M295 Class F
c. Foaming Agent shall be Geofill Concrete: ASTM C796
d. Water: MaineDOT Construction Manual, Section 602
e. Geofill LD shall have the following properties:
    1) Range of Cast Density = 24-30 pcf
    2) Flow Consistency per ASTM D6107 = > 7”
    3) Minimum Compressive Strength: (28 days) = 40 psi

Leave abandoned underground piping in place, plug, or cap and fill with flowable concrete fill. Remove or cut abandoned underground piping castings a minimum of 12 inches below finished

surface and area backfilled.

Cut sections of piping to be removed to nearest solid support or provide appropriate new supports and cap remaining ends before backfilling, unless noted on Drawings or directed by Engineer.

803.03 Method of Measurement

Test Pits shall be measured by the cubic yard excavated for each test pit completed.

Removal/abandonment of manholes shall be measured by the unit each for each manhole removed or abandoned.

Manhole base sections shall be measured by the unit each for each unit installed complete and in place.

Manhole barrel sections shall be measured by the vertical foot for the actual number of vertical feet of barrel sections installed.

Manhole frames and covers shall be measured by the unit each for each unit installed complete and in place.

803.04 Basis of Payment

The accepted quantity of test pits shall be paid for at the contract unit price per cubic yard excavated. Payment shall be full compensation for all labor, equipment, tools and materials to determine location, depth, diameter and material type for uncharted utilities or to shut off existing utilities in locations shown on Drawings, excavation, removing and disposing of unsuitable materials, replacement of unsuitable materials with select backfill, backfilling and compacting in accordance with the Contract Documents, loam and seed, and all other incidentals necessary to excavate uncharted utilities or locations noted in Drawings to determine information required.

The accepted quantity of manholes removed or abandoned shall be paid for at the contract unit price per each removed or abandoned. Payment shall be full compensation for all labor, materials, equipment, and services for abandoning or removing existing sewer manholes as indicated on the Drawings. This work includes, as applicable, excavation, removal of existing casting and top section of structures, removal and disposal of structure elements, bricking and bulkheading existing pipe connections, filling of the structure with crushed stone, flowable concrete fill, or other approved material, compaction, shoring/bracing, normal dewatering, landscape restoration, loam and seed, and all other appurtenances contained within the work as shown on the Drawings and specified herein.

The accepted quantity of manhole base sections shall be paid for at the contract unit price per each, complete in place. Payment shall be full compensation for installing all materials, labor, equipment, and tools; for installing precast concrete manhole bases, pavement cutting, removal and disposal of pavement, excavation, bedding, shoring/bracing and sheeting left in place, backfill and compaction, interior drop connections if required, connection to existing sewer with new pipe

if applicable, supports, damp proofing, flexible boots, butyl sealants, constructing inverts, concrete encasement, link seals, hydraulic cement, coring, manhole rungs, bricking and bulkheading of existing piping where noted on the Drawings, extended bases for anti-flotation shall be provided where required based on calculations to be performed by the Contractor or as directed by the Engineer before the start of construction, setting, jointing, and testing; and for all other work and expenses incidental thereto.

The accepted quantity of manhole barrel sections shall be paid for at the contract unit price per vertical foot, complete in place. Payment shall be full compensation for installing all materials, labor, equipment, and tools for installing precast concrete manhole barrel sections, pavement cutting, removal and disposal of pavement, excavation, bedding, shoring/bracing and sheeting left in place, backfill and compaction, interior drop connections if required, connection to existing sewer with new pipe if applicable, supports, damp proofing, flexible boots, butyl sealants, constructing inverts, concrete encasement, link seals, hydraulic cement, coring, manhole rungs, bricking and bulkheading of existing piping where noted on the Drawings, extended bases for anti-flotation shall be provided where required based on calculations to be performed by the Contractor or as directed by the Engineer before the start of construction, setting, jointing, and testing and for all other work and expenses incidental thereto.

The accepted quantity of manhole frames and covers shall be paid for at the contract unit price per each, complete in place. Payment shall be full compensation for installing all materials, labor, equipment, and tools; for setting frames and covers to final grade of standard frames and covers, including brick and mortar leveling courses or concrete grade rings, and asphalt collar over frame base. Contractor shall be responsible for setting manhole frame and cover grades during temporary and final paving and all resetting, raising, or lowering of associated roadway; and for all other work and expenses incidental thereto.

Payment shall be full compensation for all labor and materials for a complete installation.

Payment will be made under:

Pay Item		Pay Unit
803.011	Test Pits	Cubic Yard
803.181	Remove/Abandon Manhole	Each
803.172	Sewer Manhole – 5 Foot Diameter Base Section	Each
803.1721	Sewer Manhole – 5 Foot Diameter Barrel Section	Vertical Foot
803.173	Sewer Manhole – 4 Foot Diameter Base Section	Each
803.1732	Sewer Manhole – 4 Foot Diameter Barrel Section	Vertical Foot
803.18	Standard Sewer Frame & Cover	Each

SPECIAL PROVISION
SECTION 812
SEWER MANHOLE
(Adjusting Sewer Manhole to Grade)

The 2020 Standard Specifications with the following additions shall apply:

812.01 Description

This work shall consist of adjusting sewer manhole frame and cover to grade as indicated in the Bid Book, Plans, or as directed by the Resident.

Adjusting Sewer Manhole shall consist of removing the frame and cover, removing and re-installing concrete rings, and adjusting a manhole frame to the required final grade, slope and height including any temporary lowering for milling and any other adjustments that may be necessary prior to setting the final grade and in accordance with this Section, Standard Specification Section 604 - Manholes, Inlets, and Catch Basins, and Standard Details Section 604.

812.02 Method of Adjustment

The Contractor shall saw cut the existing pavement for the patch at least two feet away from the nearest edge of the structure.

The existing sewer frame/cover, and courses of brick shall be removed, and structure thoroughly cleaned. The surface between the remaining structure and the new masonry work shall be scarified, washed, and cleaned before constructing the new masonry work. Then, add new concrete rings as necessary to reset to the new grade using Portland Type II cement mortar, concrete rings or other materials approved by the Resident. Bricks may be used for adjusting and shimming only.

The exterior face of the concrete grade rings and manhole frames shall be protected with by applying 1 heavy coat of asphalt sealant.

Unless otherwise provided, mortar for these structures shall meet the requirements of Section 705.02 – Joint Mortar.

Protection from traffic shall be maintained until the mortar is properly cured.

All HMA for patching around adjusted, altered, or rebuilt utility structures shall meet gradation requirements of a 9.5 mm or 12.5 mm mixture. The Contractor shall place HMA in lifts of 1” or less, as directed by the resident, and compact the HMA using a minimum of a 150-pound plate compactor. HMA for patching around adjusted, altered, or rebuilt utility structures is considered incidental to the respective pay item for adjust, alter, or rebuild utility structure.

Each manhole that is adjusted shall be cleaned of all accumulated silt, debris, and other foreign matter before final acceptance of the work and such cleaning shall be considered incidental to the adjust item.

Manhole frame finish grade tolerance shall be 0" above and 3/8" below finished pavement grade.

812.03 Method of Measurement

Adjusted Sewer manhole will be measured by the unit price each, complete and in place.

812.04 Basis of Payment

Adjusted Sewer Manhole item shall be full compensation for all equipment, labor, concrete rings, brick, and incidental materials (including pavement) necessary to adjust the sewer manhole frame and cover to grade as specified above.

Payment will be made under:

Pay Item		Pay Unit
812.162	Adjusting Sewer Manhole to Grade	Each

SPECIAL PROVISION

SECTION 033001

CAST-IN-PLACE CONCRETE - SITEWORK

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. The provisions of the 2020 Standard Specifications, Section 502 Structural Concrete, and Section 503 Reinforcing Steel with the following additions shall apply:

1.2 SUMMARY

A. Provide all equipment and materials, and do all work necessary to construct the cast-in-place concrete for sitework, including but not limited to: exterior concrete walls, curbs, stairs, below grade slabs, pads, bases, foundations, and footings, complete, as indicated on the Drawings and as specified.

1.3 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that relate directly to work of this Section include, but are not limited to the following:

1. Section 044302, GRANITE - SITEWORK; Granite bench seating.
2. Section 055501, METAL FABRICATIONS – SITEWORK; Core ten steel face plates.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Concrete Institute (ACI):

301	Structural Concrete for Buildings
303R	Guide to Cast-In-Place Architectural Concrete Practice
306.1	Cold Weather Concreting
308	Standard Practice for Curing Concrete
325.9R	Guide for Construction of Concrete Pavements and Concrete Bases

2. American Plywood Association (APA):

Ref. 1	APA Design/Construction Guide, Residential and Commercial

3. American Society for Testing and Materials (ASTM):

A 36	Structural Steel
A 123	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
A 307	Carbon Steel Externally Threaded Standard Fasteners
A 386	Zinc Coating (Hot-Dip) on Assembled Steel Products
A510	General Requirements for Wire Rods and Course Round Wire, Carbon Steel
A 569	Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality
A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A 1064	Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
C 33	Concrete Aggregates
C 143	Slump of Portland Cement Concrete
C 150	Portland Cement
C 171	Sheet Materials for Curing Concrete
C 309	Liquid Membrane-Forming Compounds for Curing Concrete
C 494	Chemical Admixtures for Concrete
D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.5 SUBMITTALS

A. Shop drawings of reinforcing steel shall be submitted. Drawings shall indicate bar sizes, locations, spacings, quantity required, bending and cutting schedules, and supporting and spacing devices.

B. Formwork Shop Drawings: Show formwork construction including form-facing joints, rustications, construction and contraction joints, form joint-sealant details, form tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect exposed to view cast-in-place concrete.

C. Samples of the following shall be submitted: Preformed joint filler, two pieces, full depth and width, 4 inchs long

D. Prior to start of concrete work, Contractor shall submit to the Resident for review a schedule for execution of the work of this section and a location plan indicating sequence of concrete placement and location of proposed control joints and construction joints, if required.

1.6 PRECONSTRUCTION MOCK-UPS

A. General

1. Schedule mock-up casting for acceptance 30 days prior to casting of concrete surfaces represented by the mockups.
2. Locate mock-up panels in non-public areas accepted by the Resident.
3. Continue to cast mock-ups until acceptable mock-ups area produced. Accepted mock-ups shall be the standard for color, texture, and workmanship for the work.
4. Mock-up sequence of forming, placing, form removal, curing, and finishing shall be reviewed and accepted by the Resident.
5. Demonstrate in the construction of the mock-up formwork the sealer material, form release agent, and curing materials and methods to be used.
6. Mock-up formwork shall be inspected and accepted by the Resident before placing of concrete.
7. Use the same concrete mixes and placement procedures, accepted in mock-ups, in the final work, unless otherwise directed by the Resident.
8. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-up.
9. Remove mockups from site at completion of project, as directed by the Resident.

B. Mockups: Cast mockups of full-size sections simulating actual design and execution conditions for concrete mix materials, reinforcement, formwork, placing sequence, form removal, curing, finishing, methods and materials of stain removal and correction of defective work, and overall standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Resident.
   a. Site Wall: 6’ long x 4’ tall x full thickness, specified color and board formed finish
2. Notify Resident seven days in advance of dates and times when mockups will be constructed.
3. Obtain Resident's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Resident.

C. Source of Materials. Utilize the same source, stock, or brand of concrete materials for each class or mix of concrete which is to be exposed. Do not interchange materials or mixes until an additional mock-up shows that uniformity in finish texture and color, as compared to original mock-up will be maintained. If necessary, obtain and stockpile materials in sufficient quantity to ensure continuity and uniformity.

PART 2 PRODUCTS

2.1 AGGREGATE BASE COURSE

A. Material for aggregate base course shall be a graded, granular, non-frost susceptible, free-draining material, consisting of either durable stone and coarse sand or of blast furnace slag, practically free from loam and clay, and which can be readily compacted to form a stable foundation.

1. Material shall conform to MDOT Specifications Section 703.06(a), Type “B” "Aggregate for Base".

2.2 FORMS

A. Formwork:

1. Approved nonabsorptive panel materials that will provide continuous, true, and smooth architectural concrete surfaces in accordance with ACI 303.1.

B. Board Forms for Exposed Walls:

1. Form-Facing Panels for As-Cast Finishes (Board Form): Exterior-grade plywood panels, non-absorptive, complying with DOC PS 1, suitable for attachment of board form liners.
2. Backing formwork panels at curved walls may be curved or segmented at Contractor’s Option for means-and-methods.
3. Form Liners (Type 1 – Board Form): Units of face design, texture, arrangement, and configuration indicated. Furnish with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent surface treatments of concrete. Provide the following:
   a. Rough-sawn lumber boards with tongue-and-groove ship lap edges, 4 inch (100 mm width. Provide in longest practicable lengths but not less than 144 inches (3658 mm) in length, for layout as indicated on Drawings.
   b. Curved boards where curved walls are indicated on Drawings.
4. Rustication Strips: Metal, rigid plastic, or dressed wood with sides beveled and back kerfed; non-staining; in longest practicable lengths.
5. Chamfer Strips: Metal, rigid plastic, elastomeric rubber, or dressed wood, 3/4 by 3/4 inch (19 by 19 mm), minimum; non-staining; in longest practicable lengths.

C. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800, "Specification 810.1, Expanded Cellular Glazing Tape"; minimum 1/4 inch (6 mm) thick.

D. Form Ties: Provide prefabricated, adjustable length galvanized steel snap-off ties, with brackets, cones, cornerlocks and other accessories as necessary.

E. Form Coatings: Commercial formulation compounds that will not bond with, stain or adversely affect concrete.

F. Forms shall be true to line and free from warp, and shall be of sufficient strength, when staked, to resist the pressure of the concrete without springing. Formwork shall be designed so that sections may be fastened together to prevent vertical or horizontal movement of ends.

G. Concrete Column Forms: Sonotube Concrete Forms, manufactured by Sonoco, 1 North Second Street, Hartsville, South Carolina 29550. Toll Free (888) 875-8754. Website www.sonotube.com, or an approved equal.

2.3 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.4 EXPANSION JOINTS

A. Unless otherwise indicated on the Drawings, expansion joints shall be located 30 ft. o.c., maximum.

B. Site Walls, Steps and Curbs:

1. Where indicated, wall expansion joints shall be 3/8 in. wide, and recessed ½ in. from face of wall. Expansion joint filler shall be [flexible foam expansion joint filler composed of a unique synthetic foam of isomeric polymers in a very small, closed-cell structure conforming to ASTM D 1752, similar to Ceramar Flexible Foam Expansion Joint Filler, manufactured by W.R. Meadows, Inc., or preformed, nonbituminous type joint filler conforming to ASTM D 1752, Type II, similar to Sealtight Cork or Self-Expanding Cork Expansion Joint Filler, manufactured by W.R. Meadows, Inc., or approved equal.
   a. Premolded filler shall be one piece for the full depth and width of the joint. Use of multiple pieces of lesser dimensions to make up required depth and width of joint will not be permitted.
   b. Except as otherwise noted on the Drawings, joint filler shall be 3/8 in. thick.
   c. Doweled at each expansion joint. One end of the dowel shall be greased.

C. Expansion joints of slab-on-grade shall be doweled. Dowel shall be centered over the joint prior to concrete placement. The end of the dowel at the side of joiint which will be poured second shall be greased immediately before concrete placement.

1. Round Expansion Joint Dowels: ASTM A615, Grade 60, epoxy-coated, smooth, billet-steel bars, clean and free of rust and scale.
2. Sleeves for Square Dowels: Sika Greenstreak square dowel sleeves and bases sized to fit epoxy-coated square dowels.
3. Dowel Caps for Round Dowels: Plastic caps approximately 4" long, designed and manufactured to fit over ends of expansion joint dowels to allow longitudinal movement of dowels after concrete has hardened.
4. Dowel Aligners for Round Dowels: PNA Dowel Aligners, or approved equal.

2.5 CONTROL JOINTS (Below grade slabs)

A. Control joints indicated to be sawn shall be made by saw cutting concrete slab after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab. Saw blade shall cut into slab at least 1 in., but in no case less than 25% of slab depth.

2.6 BOLTS

A. Anchor bolts shall conform to ASTM A 307.

B. Expansion bolts for anchoring into existing concrete shall conform to ASTM A 307, and shall have a self-drilling shell similar to Phillips Red Head Self-Drilling Shells, manufactured by Phillips Red Head Anchor Division of ITT, Michigan City, IN., or approved equal.

2.7 RELATED MATERIALS

A. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

PART 3 EXECUTION

3.1 GRADING

A. Areas to be paved will be compacted and brought approximately to subgrade elevation before work of this section is performed. Final fine grading, filling, and compaction of subgrade to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines, shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to the appropriate sections of the Contract.

C. Subgrade of areas to be paved shall be recompacted as required to bring top 8 in. of material immediately below gravel base course to a compaction of at least 90% of maximum density, as determined by ASTM D 1557, Method D. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.

D. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade or subbase subsequent backfill and compaction shall be performed as directed by the Resident. Completed subgrade after filling such areas shall be uniformly and properly graded.

E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 2 in. deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing pavement.

F. Materials shall not be stored or stockpiled on subgrade.

G. Disposal of debris and other material excavated and/or stripped under this section, and material unsuitable for or in excess of requirements for completing work of this Section shall conform to the following:

1. Material shall be legally disposed of off-site.

3.2 AGGREGATE BASE COURSE

A. Aggregate base course for paving and the spreading, grading, and compaction methods employed shall conform to standard requirements for usual base course of this type for first class road work, and the following:

1. MDOT Standard Specifications Section 401 for Aggregate Base.

B. Compaction of aggregate base course shall be to 95% of maximum density as determined by ASTM D 1557, Method D. Stone greater than 2 in. shall be excluded from course.

C. Width of base course shall be greater than or equal to the width of pavement surface, if continuous lateral support is provided during rolling, and shall extend at least 2 x base thickness beyond edge of the course above, if not so supported.

D. Aggregate material shall be applied in lifts less than or equal to 6 in. thick, compacted measure. Each lift shall be separately compacted to specified density, using a 6 ton steel wheel roller or vibratory roller equivalent to a 6 ton static roller, or an approved equivalent.

1. Material shall be placed adjacent to wall, manhole, catch basin, and other structures only after they have been set to required grade and level.
2. Rolling shall begin at sides and progress to center of crowned areas, and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.
3. Surface irregularities which exceed 1/2 in. measured by means of a 10 ft. long straightedge shall be replaced and properly compacted.

E. Subgrade and base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with gravel. Materials spilled outside pavement lines shall be removed and area repaired.

F. Portions of subgrade or of construction above which become contaminated, softened, or dislodged by passing of traffic, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification before proceeding with next operation.

3.3 EMBEDDED ITEMS

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.

3.4 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.5 FORMWORK

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. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place architectural concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class B, 1/4 inch (6 mm).

C. Fabricate forms to result in cast-in-place architectural concrete that complies with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-in-place surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood rustications, keyways, reglets, recesses, and the like, for easy removal.

1. Seal form joints and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.
2. Do not use rust-stained steel form-facing material.

E. 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.

F. Chamfer exterior corners and edges of cast-in-place architectural concrete.

G. Coat contact surfaces of wood form liners, rustications, and chamfer strips with sealer before placing reinforcement, anchoring devices, and embedded items.

H. Form openings, chases, offsets, sinkages, keyways, 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, 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. For as-cast finishes, coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

L. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and attach securely to prevent deflection and maintain stability of liners during concreting. Prevent form liners from sagging and stretching in hot weather. Seal joints of form liners and form liner accessories to prevent mortar leaks. Coat form liner with form-release agent.

1. Attach lumber board liners using blind-nailing at ship lap edges. Form tight joints between boards. Do not use spacers at joints between boards.
2. Attach lumber board liners in half-stagger pattern so ends of boards are offset between each row of boards.
3. Locate form ties at locations of joints between lumber board liners, space evenly.

3.6 EARTH FORMED CONCRETE

A. Earth formed concrete footings shall be excavated under work of Section 312300, SITE EXCAVATING, BACKFILLING AND COMPACTING to the depth and shape indicated on the Drawings. Earth formed footings shall be continuous.

3.7 REINFORCING

A. Before being placed in position, reinforcing shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between the concrete and reinforcing. Where there is delay in placing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.

B. Any bar showing cracks after bending shall be discarded.

C. Unless otherwise indicated on the Drawings, reinforcing shall extend within 2 in. of formwork and expansion joints. Reinforcing shall continue through control joints. Adjacent sheets of fabric reinforcing shall lap 6 in.

D. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel and anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Resident.

3.8 FINISHING

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Remove fins and other projections exceeding specified limits stated in ACI 301 for SF-3.0 Surface Finish. Repair and patch tie holes and defects in accordance with ACI 301 for SF-3.0 Surface Finish.

3.9 AS-CAST FORMED FINISHES (BOARD FORM)

A. Board Formed Finish: Exposed vertical surfaces shall be formed to produce a "Board formed finish", to match the accepted preconstruction mock-up panel and image indicated on the Drawings. Create as-cast concrete wood plank texture imparted by form-facing lumber material or form liners, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that vary from the approved sample panel for board formed finish.

B. Form-Liner Finish: Produce a textured surface free of pockets, streaks, and honeycombs, and of uniform appearance, color, and texture.

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 trowel finish.

D. Maintain uniformity of special finishes over construction joints unless otherwise indicated.

3.10 FINISHING BELOW GRADE SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

1. Concrete slabs and pads shall be screeded off and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.
2. Finished concrete surface for subbases shall be wood-floated to a slightly rough surface. Surface shall not deviate more than 1/4 in. in 10 ft.

B. Control joints shall be sawn.

C. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

3.11 EXPANSION JOINTS

A. Expansion joints shall be 3/8 in. wide and shall be as located on the Drawings. Expansion joint shall be formed in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full depth of the slab. Joint filler shall extend the full length of the expansion joint.

1. Joint filler shall not extend above concrete slab. Depth of filler shall be as required to form a 1¼" deep sealant and backer rod recess below finished grade of paved surface.
2. Depth of joint filler shall be as required to form a 1-1/4 in. deep sealant and backer rod recess below finished concrete surface.

3.12 EXPANSION JOINT DOWELS:

A. Center vertically in slab, unless indicated otherwise.

B. Center longitudinal position of each dowel horizontally on joint, except where indicated otherwise.

C. Install at same spacing as slab bar unless indicated on Drawings.

D. Install a cap or sleeve on one end of each dowel as indicated on Drawings.

E. Prior to installing the cap or sleeve on the dowels, completely coat surfaces of each dowel on the cap-side or sleeve-side of the expansion joint with debonding compound.

F. Cut holes in expansion joint fill material accurately to fit tightly around dowels so that concrete will not leak into gaps between the dowels and the expansion joint material.

G. Install dowels 90 degrees horizontally and vertically to expansion joint using dowel aligners to help maintain alignment.

H. Install the dowel aligners in accordance with the manufacturer's current printed instructions.

3.13 CONTROL JOINTS

A. Joints shall be sawn as soon as the concrete will withstand the energy of sawing without raveling or dislodging aggregate particles. For most concrete mixtures, this means sawing should be completed within the first 6 to 18 hours and never delay more than 24 hours. Early-entry saws may be used to allow cutting to begin within a few hours after placement.

B. Control joints shall be sawn 1/8 in. wide by using a diamond blade concrete power saw. Saw shall cut into slab at least 25% of slab depth. Saw cut joints shall be straight and accurate to line.

1. Sawcut joints shall be sawn flush to vertical surfaces.,
2. Dowelled Control Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.14 SEALING OF JOINTS

A. Where indicated on the Drawings, expansion joints shall be sealed with joint sealant in accordance with Section 079201, EXTERIOR JOINT SEALANTS - SITEWORK.

3.15 PATCHING FORMED SURFACES OF EXPOSED CONCRETE

A. After forms have been removed, inspect concrete surfaces and only at the direction of the Resident, patch pour joints, voids, stone pockets, other defective areas and before concrete is thoroughly dry. Chip away defective areas to depth of not less than 1 in. with edges perpendicular to surface. Wet areas to be patched and space at least 6 in. wide entirely surrounding it, to prevent absorption of water from patching mortar. Do not patch concrete in freezing weather.

B. Apply chemical bonding agent to surface in accordance with manufacturer's printed instructions, followed immediately by patching mortar. Make patch of same proportions used for concrete except omit coarse aggregate. Add only enough water consistent with requirements for handling and placing.

C. Thoroughly compact mortar into place and screed off; leave patch slightly higher than surrounding surface. Leave undisturbed for one to two hours to permit initial shrinkage before final finishing. Finish patch to match texture and color of adjoining surface.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Resident. Remove and replace concrete that cannot be repaired and patched to Resident's approval.

END OF SECTION