MAINE TURNPIKE AUTHORITY

MAINE TURNPIKE

CONTRACT DOCUMENTS

CONTRACT 2024.11

CUMBERLAND SERVICE PLAZA
FUEL SYSTEM REPLACEMENT
SOUTHBOUND MM 58.8

NOTICE TO CONTRACTORS

PROPOSAL

CONTRACT AGREEMENT

CONTRACT BOND

FINAL LIEN AND CLAIM WAIVER AND AFFIDAVIT

SPECIFICATIONS

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

The Specifications are divided into two parts:
Part I, Supplemental Specifications and Part II, Special Provisions.

The Maine Turnpike Supplemental Specifications are additions and alterations to the 2014 Maine Department of Transportation Standard Specifications. See Subsection 100.1.

TABLE OF CONTENTS

MAINE TURNPIKE AUTHORITY

NOTICE TO CONTRACTORS

Sealed Proposals will be received by the Maine Turnpike Authority for:

CONTRACT 2024.11

CUMBERLAND SERVICE PLAZA
FUEL SYSTEM REPLACEMENT
SOUTHBOUND MM 58.8

at the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, ME, until 11:00 a.m., prevailing time as determined by the Authority on May 14, 2024 at which time and place the Proposals will be publicly opened and read. This Project includes a wage determination developed by the State of Maine Department of Labor.

Bids will be accepted from Contractors who can demonstrate a minimum of three (3) successful similar fuel system projects. A list of these projects, including Owner contact information, shall accompany the Proposal. A summary of each construction project must also be submitted demonstrating experience with, but not limited to: demolition of underground storage tanks and piping, proper management of contaminated soils and groundwater, installation of underground tanks, piping, electrical and communication, concrete dispenser slab constructions, canopy installation, dispenser installation, electrical, communication, lighting, and fire suppression system installations. The contractor must also submit a list of Certified Tank Installers that will be assigned to this project.

The work consists of removing and replacing the underground gas and diesel storage tanks at the southbound service plaza in Cumberland, providing final installation of temporary gas and diesel dispensers, associated electrical, mechanical, drainage, site work, maintenance of traffic and all other work incidental thereto in accordance with the Plans and Specifications.

Plans and Contract Documents may be examined by prospective Bidders weekdays between 8:00 a.m. and 4:30 p.m. at the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine. **The half size Plans** and Contract Documents may be obtained from the Authority upon payment of Fifty ($50.00) Dollars for each set, which payment will not be returned. Checks shall be made payable to: Maine Turnpike Authority. The Plans and Contract Documents may also be downloaded from a link on our website at http://www.maineturnpike.com/project-and-planning/Construction-Contracts.aspx.

For general information regarding Bidding and Contracting procedures, contact Nate Carll, Purchasing Manager, at (207)482-8115. For information regarding Schedule of Items, plan holders list and bid results, visit our website at **http://www.maineturnpike.com/project-and-planning/Construction-Contracts.aspx** . For Project specific information, fax all questions to Nate Carll, Purchasing Manager, at (207) 871-7739 or email ncarll@maineturnpike.com. Responses will not be prepared for questions received by telephone. Bidders shall not contact any other Authority

staff or Consultants for clarification of Contract provisions, and the Authority will not be responsible for any interpretations so obtained.

All work shall be governed by the Specifications entitled "State of Maine, Department of Transportation, Standard Specifications, Revision of November 2014", "Standard Details, Revision of November 2020" and "Best Management Practices for Erosion and Sediment Control", latest issue. Copies and recent updates to these publications can be downloaded at: http://www.maine.gov/mdot/contractors/publications/ .

Proposals must be accompanied by an original bid bond, certified or cashier's check payable to the Maine Turnpike Authority in an amount not less than Five (5%) Percent of the Total Amount in the Proposal, but not less than $500.00. The Bidder to whom a Contract is awarded will be required to furnish a Surety Corporation Bond, satisfactory to the Authority, on the standard Contract Bond form of the Authority, for a sum not less than the Total Amount of the Proposal.

Proposals must be made upon the Proposal Forms furnished by the Authority separately with the Contract Documents, and must be enclosed in the sealed special addressed envelope provided therefore bearing the name and address of the Bidder, the name of the Contract, and the date and time of Proposal opening on the outside.

A pre-bid conference will be held on April 30, 2024 at 10:00 a.m. at the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine.

The Authority reserves the unqualified right to reject any or all Proposals and to accept that Proposal which in its sole judgment will under all circumstances serve its best interest.

MAINE TURNPIKE AUTHORITY

Nate Carll
Purchasing Manager
Maine Turnpike Authority
Portland, Maine

Maine Turnpike Authority

MAINE TURNPIKE

PROPOSAL

CONTRACT 2024.11

CUMBERLAND SERVICE PLAZA
FUEL SYSTEM REPLACEMENT
SOUTHBOUND MM 58.8

MAINE TURNPIKE AUTHORITY

PROPOSAL

CONTRACT 2024.11

CUMBERLAND SERVICE PLAZA
FUEL SYSTEM REPLACEMENT
SOUTHBOUND MM 58.8

TO MAINE TURNPIKE AUTHORITY:

The work consists of removing and replacing the underground gas and diesel storage tanks, diesel and gas dispenser slabs, and installing a new diesel canopy with fire suppression system at the southbound travel plaza in Cumberland, in addition to providing final installation of temporary gas and diesel dispensers using leased aboveground storage tanks, associated electrical, mechanical, drainage, site work, maintenance of traffic and all other work incidental thereto in accordance with the Plans and Specifications.

This Work will be done under a Contract known as Contract 2024.11 according to the Plans and Specifications which are on file in the office of the Maine Turnpike Authority, 2360 Congress Street, Portland, Maine.

On the acceptance of this Proposal for said Work, the undersigned will give the required bond with good security conditioned for the faithful performance of said Work, according to said Plans and Specifications, and the doing of all other work required by said Specifications for the consideration herein named and with the further condition that the Maine Turnpike Authority shall be saved harmless from any and all damages that might accrue to any person, persons or property by reason of the carrying out of said Work, or any part thereof, or by reason of negligence of the undersigned, or any person or persons under his employment and engaged in said Work.

The undersigned hereby declares that he/she has carefully examined the Plans, Specifications and other Contract Documents, and that he/she will contract to carry out and complete the said Work as specified and delineated at the price per unit of measure for each scheduled item of Work stated in the Schedule of Prices as follows:

It is understood that the TOTAL AMOUNT stated by the undersigned in the following Schedule of Prices is based on approximate quantities and will be used solely for the comparison of bids, and that the quantities stated in the Schedule of Prices for the various items are estimates only and may be increased or decreased all as provided in the Specifications.

SCHEDULE OF BID PRICES
CONTRACT NO. 2024.11
CUMBERLAND SERVICE PLAZA FUEL SYSTEM REPLACEMENT
SOUTHBOUND MM 58.8

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
202.17	Removing Existing Structural Concrete	Lump Sum	1				
203.20	Common Excavation	Cubic Yard	390				
203.2312	Health and Safety Plan	Lump Sum	1				
203.2333	Disposal/Treatment of Special Excavation	Ton	400				
203.2334	Disposal/Treatment of Contaminated Groundwater	Gallon	150,000				
206.061	Structural Earth Excavation - Drainage & Minor Sturctures Below Grade	Cubic Yard	25				
304.10	Aggregate Subbase Course - Gravel	Cubic Yard	280				
304.14	Aggregate Base Course - Type A	Cubic Yard	100				
403.207	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size	Ton	370				
403.208	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size	Ton	230				
403.209	Hot Mix Asphalt 9.5 mm (sidewalks, drives, islands & incidentals)	Ton	2				

CARRIED FORWARD:

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
			BROUGHT FORWARD:				
403.213	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course)	Ton	230				
409.15	Bituminous Tack Coat RS-1 or RS1h– Applied	Gallon	210				
419.30	Sawing Bituminous Pavement	Linear Foot	1,650				
502.701	Concrete Gas Island and Slab	Cubic Yard	75				
502.702	Concrete Diesel Island and Slab	Cubic Yard	40				
502.703	Concrete Fuel Tank Slab	Cubic Yard	75				
503.14	Epoxy-Coated Reinforcing Steel, Fabricated and Delivered	Pound	8,510				
503.15	Epoxy-Coated Reinforcing Steel, Placing	Pound	8,510				
524.30	Temporary Structural Support	Each	1				
526.306	Temporary Concrete Barrier, Type I - Supplied by Authority (780 LF)	Lump Sum	1				
603.05	6 inch PVC Pipe	Linear Foot	390				
603.155	12 inch RCP Class III	Linear Foot	400				

CARRIED FORWARD:

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
			BROUGHT FORWARD:				
603.175	18 inch RCP Class III	Linear Foot	70				
604.09	Catch Basin Type B1	Each	2				
604.15	Manhole	Each	2				
604.248	Catch Basin Type F6	Each	2				
604.30	Oil-water Separator	Each	1				
606.178	Guardrail Beam	Linear Foot	50				
606.356	Underdrain Delineator Post	Each	1				
606.3605	Guardrail - Remove, Modify and Reset Single Rail	Linear Foot	125				
606.3606	Guardrail - Remove, Modify and Reset Double Rail	Linear Foot	75				
607.18	6 Foot Chain Link Safety Fence	Linear Foot	330				
607.24	Remove and Reset Fence	Linear Foot	100				
608.08	Reinforced Concrete Sidewalk	Square Yard	30				

CARRIED FORWARD:

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
			BROUGHT FORWARD:				
609.31	Curb Type 3	Linear Foot	70				
609.38	Reset Curb Type 1	Linear Foot	30				
609.40	Reset Curb Type 5	Linear Foot	20				
615.07	Loam	Cubic Yard	87				
618.13	Seeding Method Number 1	Unit	2				
618.14	Seeding Method Number 2	Unit	13				
619.1201	Mulch - Plan Quantity	Unit	14				
619.1202	Temporary Mulch	Lump Sum	1				
626.36	Removing or Modify Concrete Foundation	Each	1				
627.712	White or Yellow Pavement Marking Line	Linear Foot	2,250				
627.731	Temporary 6 Inch Black Pavement Marking Tape	Linear Foot	400				
627.77	Removing Existing Pavement Marking	Square Foot	1,600				

CARRIED FORWARD:

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
			BROUGHT FORWARD:				
627.78	Temporary 4" Painted Pavement Marking Line, White or Yellow	Linear Foot	2,430				
629.05	Hand Labor, Straight Time	Hour	20				
631.12	All Purpose Excavator (including operator)	Hour	20				
631.172	Truck-large (including operator)	Hour	40				
631.221	Small Front End Loader (including operator)	Hour	20				
631.32	Culvert Cleaner (including operators)	Hour	5				
631.36	Foreman	Hour	20				
634.2082	Removing Existing Light Standard	Each	1				
634.23	Temporary Lighting	Lump Sum	1				
639.19	Field Office, Type B	Each	1				
645.109	Remove and Reset Sign	Each	4				
652.312	Type III Barricades	Each	3				

CARRIED FORWARD:

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
			BROUGHT FORWARD:				
652.33	Drum	Each	45				
652.35	Construction Signs	Square Foot	160				
652.361	Maintenance of Traffic Control Devices	Lump Sum	1				
652.41	Portable-Changeable Message Sign	Each	1				
656.50	Baled Hay, In Place	Each	8				
656.632	30 Inch Temporary Silt Fence	Linear Foot	900				
659.10	Mobilization	Lump Sum	1				
801.10	Removal of Existing Fuel System (Underground Tanks, Gasoline, and Diesel systems)	Lump Sum	1				
802.10	Aboveground Diesel Tank	Lump Sum	1				
802.20	Aboveground Gasoline Tank	Lump Sum	1				
803.10	Underground Tanks (Gasoline and Diesel)	Lump Sum	1				
804.10	New Canopy (Diesel)	Lump Sum	1				

CARRIED FORWARD:

Item No	Item Description	Units	Approx. Quantities	Unit Prices in Numbers		Bid Amount in Numbers	
				Dollars	Cents	Dollars	Cents
BROUGHT FORWARD:							
832.41	Type A Steel Site Bollard	Each	9				
TOTAL:							

Acknowledgment is hereby made of the following Addenda received since issuance of the Plans and Specifications: _____

_____

_____

Accompanying this Proposal is an original bid bond, cashiers or certified check on _____ Bank, for _____, payable to the Maine Turnpike Authority. In case this Proposal shall be accepted by the Maine Turnpike Authority and the undersigned should fail to execute a Contract with, and furnish the security required by the Maine Turnpike Authority as set forth in the Specifications, within the time fixed therein, an amount of money equal to Five (5%) Percent of the Total Amount of the Proposal for the Contract awarded to the undersigned, but not less than $500.00, obtained out of the original bid bond, cashier's or certified check, shall become the property of the Maine Turnpike Authority; otherwise the check will be returned to the undersigned.

The performance of said Work under this Contract will be completed during the time specified in Subsection 107.1.

It is agreed that time is of the essence of this Contract and that I (we) will, in the event of my (our) failure to complete the Work within the time limit named above, pay to Maine Turnpike Authority liquidated damages in the amount or amounts stated in the Specifications.

The undersigned is an Individual/Partnership/Corporation under the laws of the State of _____, having principal office at _____, thereunto duly authorized.

_____ *(SEAL)*

_____ *(SEAL)*

Affix Corporate Seal
or Power of Attorney
Where Applicable

_____ *(SEAL)*

By: _____

Its: _____

Information below to be typed or printed where applicable:

INDIVIDUAL:

(Name)	(Address)

PARTNERSHIP - Name and Address of General Partners:

(Name)	(Address)
(Name)	(Address)
(Name)	(Address)
(Name)	(Address)

INCORPORATED COMPANY:

(President)	(Address)
(Vice-President)	(Address)
(Secretary)	(Address)
(Treasurer)	(Address)

MAINE TURNPIKE AUTHORITY

MAINE TURNPIKE

YORK TO AUGUSTA

CONTRACT AGREEMENT

This Agreement made and entered into between the Maine Turnpike Authority, and sometimes termed the "Authority", and _____

_____

herein termed the "Contractor":

WITNESSETH: That the Authority and the Contractor, in consideration of the premises and of the mutual covenants, considerations and agreements herein contained, agree as follows:

FIRST: The parties hereto mutually agree that the documents attached hereto and herein incorporated and made a part hereof collectively evidencing and constituting the entire Contract to the same extent as if herein written in full, are the Notice to Contractors, the Accepted Proposal, the Specifications, the Plans, this Agreement, the Contract Bond and all Addenda to the Contract Documents duly issued and herewith enumerated:

_____

_____

SECOND: The Contractor for and in consideration of certain payments to be made as hereafter specified, hereby covenants and agrees to perform and execute all of the provisions of this Contract and of all documents and parts attached hereto and made a part thereof, and at his own cost and expense to furnish and perform everything necessary and required to construct and complete, ready for its intended purpose, in accordance with the Contract and such instructions as the Engineer may give, acceptable to the Authority, in the times provided, all of the Work covered and included under Contract No. _____ covering _____ as herein described.

THIRD: In consideration of the performance by the Contractor of his covenants and agreements as herein set forth, the Authority hereby covenants and agrees to pay the Contractor according to the Schedule of Prices set forth in the Proposal with additions and deductions as elsewhere herein provided in the times and in the manner stated in the Specifications. This Agreement shall insure to the benefit of, and shall be binding upon the parties hereto, and upon their respective successors and assigns; but neither party hereto shall assign or transfer his interest herein in whole or in part without the consent of the other, except as herein provided.

IN WITNESS WHEREOF the parties to this Agreement have executed the same in quintuplicate.

AUTHORITY -

MAINE TURNPIKE AUTHORITY

By: _____

Title: CHAIRMAN

Date of Signature: _____

ATTEST:

_____
Secretary

CONTRACTOR -

_____
CONTRACTOR

By: _____

Title: _____

Date of Signature: _____

WITNESS:

_____

CONTRACT BOND

KNOW ALL MEN BY THESE PRESENTS that _____

of _____ in the County of _____ and 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 Maine Turnpike Authority in the sum of _____Dollars ($_____.___), to be paid to said Maine Turnpike Authority, or its successors, for which payment, well and truly to be made, we bind ourselves, our heirs, executors, successors and assigns jointly and severally by these presents.

The condition of this obligation is such that the Principal, designated as Contractor in the foregoing Contract No. _____ shall faithfully perform the Contract on his part and satisfy all claims and demands incurred for the same and shall pay all bills for labor, material, equipment and all other items contracted for, or used by him, in connection with the Work contemplated by said Contract, and shall fully reimburse 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.

Signed and sealed this _____ day of _____, A.D., 202___

Witnesses: CONTRACTOR

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

SURETY

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

_____ _____ *(SEAL)*

(Surety must attach copy of Power of Attorney showing authority of Office or Agent to execute bonds)

FINAL LIEN AND CLAIM WAIVER AND AFFIDAVIT

Upon receipt of the sum of _____, which sum represents the total amount paid, including the current payment for work done and materials supplied for Project No. _____, in _____, Maine, under the undersigned's Contract with the Maine Turnpike Authority.

The undersigned, on oath, states that the Final Payment of _____ is the final payment for all work, labor, materials, services and miscellaneous (all of which are hereinafter referred to as "Work Items") supplied to the said Project through _____and that no additional sum is claimed by the undersigned respecting said Project.

The undersigned, on oath, states that all persons and firms who supplied Work Items to the undersigned in connection with said Project have been fully paid by the undersigned for such Work Items or that such payment will be fully effected immediately upon receipt of this payment.

In consideration of the payment herewith made, the undersigned does fully and finally release and hold harmless the Maine Turnpike Authority, and its Surety, if any, from any and all claims, liens or right to claim or lien, arising out of this Project under any applicable bond, law or statute.

It is understood that this Affidavit is submitted to assure the Owner and others that all liens and claims relating to the Work Items furnished by the undersigned are paid.

_____
(Contractor)

By:

_____

Title:

_____

State of MAINE

County of _____

I, _____, hereby certify on behalf of ___ _____
(Company Officer) *(Company Name)*

its _____, being first duly sworn and stated that the foregoing representations are
(Title)

are true and correct upon his own knowledge and that the foregoing is his free act and deed in said capacity and the free act and deed of the above-named

.

(Company Name)

The above-named, _____, personally appeared before me this ____ day of _____ and swears that this is his free act and deed.

(SEAL)

_____

Notary Public

My Commission Expires: _____

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART I – SUPPLEMENTAL SPECIFICATIONS

(Rev. November 10, 2016)

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART II – SPECIAL PROVISIONS

PART II - SPECIAL PROVISIONS

Appendix	MAINE DEP STANDARD OPERATING PROCEDURE, #12	APP A

MAINE TURNPIKE AUTHORITY

SPECIFICATIONS

PART II - SPECIAL PROVISIONS

All work shall be governed by the Maine Department of Transportation Standard Specifications, Revision of November 2014, except for that work which applies to sections of the Maine Department of Transportation Standard Specifications which are amended by the Maine Turnpike Supplemental Specifications and the following modifications, additions and deletions.

General Description of Work

The work consists of removing and replacing the underground gas and diesel storage tanks and fuel systems at the southbound travel plaza in Cumberland, installing new diesel canopy with automatic fire suppression system, providing final installation of temporary gas and diesel dispensers using leased aboveground storage tanks, associated electrical, mechanical, drainage, site work, maintenance of traffic and all other work incidental thereto in accordance with the Plans and Specifications.

Plans

The drawings included in these Contract Documents, and referred to as the Plans, show the general character of the work to be done under this Contract. They bear the general title "Maine Turnpike – Contract 2024.11 – Cumberland Service Plaza - Fuel System Replacement – Southbound MM 58.8". The right is reserved by the Resident to make such minor corrections or alterations in the Plans as he deems necessary without change in the unit prices on the Schedule of Prices of the Proposal.

101.2 Definition

Holidays

The following is added after Memorial Day in the Supplemental Specifications:

Juneteenth Day 2024 (June 19, 2024)	
Independence Day 2024 (Fourth of July)	6:00 a.m. preceding Wednesday to 6:00 a.m. the following Monday.

103.4 Notice of Award

The following sentence is added:

The Maine Turnpike Authority Board is scheduled to consider the Contract Award on May 23, 2024.

104.3.8 Wage Rates and Labor Laws

Section 104.3.8 Wage Rates and Labor Laws has been amended as follows:

The fair minimum hourly rates determined by the State of Maine Department of Labor for this Contract are as follows:

THIS DOCUMENT MUST BE CLEARLY POSTED AT ALL CONSTRUCTION SITES FUNDED IN PART WITH STATE FUNDS

State of Maine Department of Labor - Bureau of Labor Standards
Augusta, Maine 04333-0045 - Telephone (207) 623-7906

Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.

2024 Fair Minimum Wage Rates -- Heavy & Bridge Cumberland County

Occupational Title	Minimum Wage	Minimum Benefit	Total
Brickmasons And Blockmasons	$35.00	$0.86	$35.86
Bulldozer Operator	$31.50	$7.53	$39.03
Carpenter	$30.65	$4.06	$34.71
Cement Masons And Concrete Finisher	$24.35	$15.65	$40.00
Commercial Divers	$26.50	$2.66	$29.16
Construction And Maintenance Painters	$27.50	$23.07	$50.57
Construction Laborer	$25.00	$4.68	$29.68
Crane And Tower Operators	$34.50	$4.29	$38.79
Crushing Grinding And Polishing Machine Operators	$23.00	$4.94	$27.94
Drywall And Ceiling Tile Installers	$26.20	$10.62	$36.82
Earth Drillers - Except Oil And Gas	$24.16	$2.53	$26.69
Electrical Power - Line Installer And Repairers	$38.93	$9.75	$48.68
Electricians	$33.41	$12.91	$46.32
Elevator Installers And Repairers	$68.38	$45.29	$113.67
Excavating And Loading Machine And Dragline Operators	$31.50	$3.08	$34.58
Excavator Operator	$35.00	$4.94	$39.94
Fence Erectors	$24.00	$2.05	$26.05
Flaggers	$20.00	$0.50	$20.50
Floor Layers - Except Carpet/Wood/Hard Tiles	$27.00	$6.21	$33.21
Glaziers	$37.00	$6.60	$43.60
Grader/Scraper Operator	$23.00	$1.99	$24.99
Hazardous Materials Removal Workers	$21.50	$1.54	$23.04
Heating And Air Conditioning And Refrigeration Mechanics And Installers	$32.00	$5.46	$37.46
Heavy And Tractor - Trailer Truck Drivers	$28.25	$3.63	$31.88
Highway Maintenance Workers	$20.00	$0.00	$20.00
Industrial Machinery Mechanics	$32.00	$0.96	$32.96
Industrial Truck And Tractor Operators	$30.00	$2.90	$32.90
Insulation Worker - Mechanical	$24.05	$3.59	$27.64
Ironworker - Ornamental	$27.75	$4.50	$32.25
Light Truck Or Delivery Services Drivers	$22.84	$1.25	$24.09
Millwrights	$31.00	$7.59	$38.59
Mobile Heavy Equipment Mechanics - Except Engines	$29.38	$3.44	$32.82
Operating Engineers And Other Equipment Operators	$28.00	$2.67	$30.67
Paver Operator	$25.30	$3.73	$29.03
Pile-Driver Operators	$35.00	$1.73	$36.73
Pipelayers	$28.50	$4.89	$33.39
Plumbers Pipe Fitters And Steamfitters	$29.75	$4.33	$34.08
Pump Operators - Except Wellhead Pumpers	$31.49	$32.08	$63.57
Radio Cellular And Tower Equipment Installers	$27.00	$3.86	$30.86
Reclaimer Operator	$27.03	$7.68	$34.71
Reinforcing Iron And Rebar Workers	$30.83	$24.97	$55.80
Riggers	$31.25	$7.68	$38.93
Roofers	$24.00	$3.35	$27.35
Screed/Wheelman	$29.25	$4.94	$34.19
Sheet Metal Workers	$27.38	$6.74	$34.12
Structural Iron And Steel Workers	$29.93	$5.74	$35.67
Tapers	$28.00	$1.71	$29.71
Telecommunications Equipment Installers And Repairers - Except Line Installers	$28.33	$6.08	$34.41
Telecommunications Line Installers And Repairers	$26.00	$2.65	$28.65
Tile And Marble Setters	$27.75	$6.73	$34.48

Welders are classified as the trade to which welding is incidental (e.g. welding structural steel is Structural Iron and Steel Worker)

Apprentices – The minimum wage rates for registered apprentices are the rates recognized in the sponsorship agreement for registered apprentices working in the pertinent classification.

For any other specific trade on this project not listed above, contact the Bureau of Labor Standards for further clarification.

Title 26 §1310 requires that a clearly legible statement of all fair minimum wage and benefits rates to be paid the several classes of laborers, workers and mechanics employed on the construction on the public work must be kept posted in a prominent and easily accessible place at the site by each contractor and subcontractor subject to sections 1304 to 1313.

Appeal – Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates.

A true copy

Attest: Scott R. Cotnoir

Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor Standards

Expiration Date: 12-31-2024
Revision Date: 1-3-2024

THIS DOCUMENT MUST BE CLEARLY POSTED AT ALL CONSTRUCTION SITES FUNDED IN PART WITH STATE FUNDS

State of Maine Department of Labor - Bureau of Labor Standards
Augusta, Maine 04333-0045 - Telephone (207) 623-7906

Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.

2024 Fair Minimum Wage Rates -- Highway & Earth Cumberland County

Occupational Title	Minimum Wage	Minimum Benefit	Total
Brickmasons And Blockmasons	$32.25	$4.33	$36.58
Bulldozer Operator	$29.00	$4.56	$33.56
Carpenter	$29.69	$6.18	$35.87
Cement Masons And Concrete Finisher	$22.67	$2.21	$24.88
Commercial Divers	$30.00	$4.62	$34.62
Construction And Maintenance Painters	$26.00	$3.81	$29.81
Construction Laborer	$25.00	$3.35	$28.35
Crane And Tower Operators	$33.93	$9.47	$43.40
Crushing Grinding And Polishing Machine Operators	$23.88	$4.94	$28.82
Drywall And Ceiling Tile Installers	$26.20	$10.62	$36.82
Earth Drillers - Except Oil And Gas	$21.65	$2.53	$24.18
Electrical Power - Line Installer And Repairers	$38.93	$8.91	$47.84
Electricians	$33.64	$18.07	$51.71
Elevator Installers And Repairers	$68.38	$45.29	$113.67
Excavating And Loading Machine And Dragline Operators	$26.00	$4.62	$30.62
Excavator Operator	$33.25	$6.34	$39.59
Fence Erectors	$20.00	$0.00	$20.00
Flaggers	$20.00	$0.41	$20.41
Floor Layers - Except Carpet/Wood/Hard Tiles	$27.00	$6.21	$33.21
Glaziers	$37.00	$6.60	$43.60
Grader/Scraper Operator	$27.40	$8.13	$35.53
Hazardous Materials Removal Workers	$21.50	$1.54	$23.04
Heating And Air Conditioning And Refrigeration Mechanics And Installers	$32.00	$5.46	$37.46
Heavy And Tractor - Trailer Truck Drivers	$25.00	$5.44	$30.44
Highway Maintenance Workers	$19.98	$2.55	$22.53
Industrial Machinery Mechanics	$31.25	$1.01	$32.26
Industrial Truck And Tractor Operators	$29.25	$4.06	$33.31
Insulation Worker - Mechanical	$24.05	$3.59	$27.64
Ironworker - Ornamental	$27.75	$4.50	$32.25
Light Truck Or Delivery Services Drivers	$21.50	$0.78	$22.28
Millwrights	$33.75	$8.78	$42.53
Mobile Heavy Equipment Mechanics - Except Engines	$28.00	$4.89	$32.89
Operating Engineers And Other Equipment Operators	$31.50	$3.75	$35.25
Paver Operator	$27.03	$5.15	$32.18
Pile-Driver Operators	$32.75	$1.95	$34.70
Pipelayers	$28.50	$4.69	$33.19
Plumbers Pipe Fitters And Steamfitters	$30.00	$5.87	$35.87
Pump Operators - Except Wellhead Pumpers	$31.49	$32.08	$63.57
Radio Cellular And Tower Equipment Installers	$26.00	$3.77	$29.77
Reclaimer Operator	$28.50	$5.72	$34.22
Reinforcing Iron And Rebar Workers	$22.67	$25.11	$47.78
Riggers	$31.25	$7.68	$38.93
Roofers	$24.00	$3.35	$27.35
Screed/Wheelman	$30.40	$4.28	$34.68
Sheet Metal Workers	$25.25	$5.68	$30.93
Structural Iron And Steel Workers	$30.04	$7.22	$37.26
Tapers	$28.00	$1.71	$29.71
Telecommunications Equipment Installers And Repairers - Except Line Installers	$28.33	$6.08	$34.41
Telecommunications Line Installers And Repairers	$26.00	$4.83	$30.83
Tile And Marble Setters	$27.75	$6.73	$34.48

Welders are classified as the trade to which welding is incidental (e.g. welding structural steel is Structural Iron and Steel Worker)

Apprentices – The minimum wage rates for registered apprentices are the rates recognized in the sponsorship agreement for registered apprentices working in the pertinent classification.

For any other specific trade on this project not listed above, contact the Bureau of Labor Standards for further clarification.

Title 26 §1310 requires that a clearly legible statement of all fair minimum wage and benefits rates to be paid the several classes of laborers, workers and mechanics employed on the construction on the public work must be kept posted in a prominent and easily accessible place at the site by each contractor and subcontractor subject to sections 1304 to 1313.

Appeal – Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates.

A true copy

Attest: Scott R. Cotnoir

Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor Standards

Expiration Date: 12-31-2024
Revision Date: 1-3-2024

104.4.6 Utility Coordination

This Subsection is amended by the addition of the following:

These Special Provisions outline the arrangements which have been established by the Authority for coordination of the work to be accomplished by the utilities. The Contractor shall plan and conduct his work accordingly.

General

Unless otherwise specified, any underground utility facilities shown on the project plans represent approximate locations gathered from available information. The MTA cannot certify the level of accuracy of this data.

Utility working days are Monday through Friday, conditions permitting. 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 Authority if they are exceeded.

The Contractor shall plan and conduct his operations in accordance with the following utility schedule. The Contractor must comply with all OSHA regulations pertaining to work adjacent to utility wires. The Contractor shall plan and conduct his work accordingly.

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

The following utilities are located within the Project limits. The Contractor shall ascertain the location of the existing utilities and any other necessary information by direct inquiry at the office of the following utility owners:

AERIAL UTILITIES

COMMUNICATION:

Consolidated Communications of Northern New England Company LLC
(207)878-0854
mdot_requests@fairpoint.com

CABLE TELEVISION:

Charter (formerly Time Warner)
(207)620-3410
dlpormeconstleadership@charter.com

ELECTRIC:

Central Maine Power
Craig Bate

(207) 808-4506
craig.bate@cmpco.com

CENTRAL MAINE POWER (CMP)

CMP requests a 10 day notification prior to start of construction adjacent to the aerial and underground lines. CMP does not anticipate any working days for utility modification.

CONSOLIDATED COMMINICATIONS OF NORTHERN NEW ENGLAND

CONSOLIDATED requests a 10 day notification prior to start of construction adjacent to the aerial and underground lines. CONSOLIDATED does not anticipate any working days for utility modification.

CHARTER (FORMERLY TIME WARNER CABLE)

CHARTER requests a 10 day notification prior to start of construction adjacent to the aerial and underground lines. CHARTER does not anticipate any working days for utility modification.

UNDERGROUND UTILITIES

Same info as for Aerial Utilities plus:

MAINE TURNPIKE AUTHORITY

The Maine Turnpike has underground electric, sewer, and water lines. Notification of all work adjacent to the lines shall be coordinated with the Resident.

104.4.7 Cooperation With Other Contractors

This Subsection is amended by the addition of the following:

The Contractor shall allow access to the site by the Authority's fuel vendor C.N. Brown for the removal and/or installation of their materials and equipment.

105.2 Asbestos

This Subsection is amended by the addition of the following:

Portions of the existing electrical conduit may contain asbestos-cement material. Unless otherwise noted or directed, the Contractor shall assume all electrical conduit is asbestos-cement material. Removal of or making connections to this material shall be performed in a manner, and using techniques, that protects workers and environmental safety and health and complies with all local, State and Federal requirements for working with this type of material. As required, the Contractor shall utilize trained and certified personnel when making these connections. Removed asbestos-cement pipe shall be transported and disposed of in a legal manner.

The following Subsection is added:

105.8.2 Permit Requirements

The Project is subject to the requirements of the Maine Pollutant Discharge Elimination System (MPDES) General Permit for Stormwater Discharge from Construction Activity, as promulgated by the US Environmental Protection Agency (US EPA) and Administrated by the Maine Department of Environmental Protection (DEP). A Notice of Intent (NOI) was submitted by the Authority to the DEP for coverage under the Maine Construction General Permit (MCGP) due to the Limit of Disturbance (LOD) being more than one acre.

Compliance with the erosion and sedimentation control requirements outlined in this Contract is required by the Contractor.

The Contractor shall prepare a LOD plan illustrating the Contractor's proposed limit of earthwork disturbance. The LOD plan shall show all construction access locations, field office locations, material and temporary waste storage locations, as well as include the Contract limits of earthwork disturbance. All applicable erosion and sedimentation control devices needed shall be detailed on the Contractor's LOD plan and are not limited to those devices shown on the Contract LOD plan. **This Plan shall be submitted for review and approval, to the Resident within 14 days of Contract award.** Payment for creating, revising, and completing this plan shall be incidental to Item 659.10, Mobilization.

The LOD for this Contract has been estimated to be 1.1 Acres.

At any time during the Contract, if the Limit of Disturbance needs to be adjusted to accommodate construction activities, the Contractor shall resubmit the LOD plan (including any additional erosion and sedimentation control measures needed) to the Resident for review and approval prior to any additional disturbance taking place:

- If the cumulative area of disturbance exceeds the estimated LOD noted above, by less than one acre, the Resident shall have a minimum of five (5) working days to approve the revised LOD plan.
- If the cumulative area of disturbance exceeds the estimated LOD noted above, by over one acre, the Resident shall first approve of the plan and then possibly submit a NOI for MaineDEP approval. The approval may take a minimum of 21 working days.

Compliance with the erosion and sedimentation control requirements outlined in this Contract is required by the Contractor.

The Contractor shall indemnify and hold harmless the Maine Turnpike Authority or its agents, representatives and employees against any and all claims, liabilities or fines arising from or based on the violation of the above noted permits.

107.1 Contract Time and Contract Completion Date

This Subsection is amended by the addition of the following:

The contractor will be permitted to construct these improvements in one of two timeframes:

Starting on September 4, 2024 and being complete by December 10, 2024; or,
starting on March 22, 2025 and being complete by June 28, 2025.

Regardless of the timeframe chosen, a maximum 14-week construction period will be required, starting from the date the temporary fuel system is put into service (and the existing system is shut down) by the Contractor, to Substantial Completion. All shop reviews and construction documentation shall be submitted prior to the start of construction.

107.1.1 Substantial Completion

This Subsection is amended by the addition of the following:

Substantially complete shall be defined by the Authority as the following:

- Existing underground storage tanks decommissioned and disposed.
- Proposed underground storage tanks and piping installed and made fully functioning.
- Final fuel systems operational and open to the public.
- Above ground storage tanks decommissioned, removed, including preparing the tanks for use with a different fuel product.
- Drainage systems installed and functioning.
- Traffic circulation returned to final conditions.
- All site work complete, pavement complete, final striping complete, and disturbed slopes loamed, seeded and mulched, and erosion control measures installed where necessary.
- Perimeter Road guardrail, bollards, and privacy fencing around underground storage tanks reinstalled.

Supplemental Liquidated damages of $1,000 per day, on a calendar day basis, in accordance with Subsection 107.8 shall be assessed for each calendar day that substantial completion is not achieved, as well as for final completion, beyond the 14-week timeframe allotted for construction.

107.4.6 Prosecution of Work

The Authority's fuel operator is responsible for removing the existing gas and diesel dispensers. The Contractor shall provide a minimum of ten days' notice to the Resident of when the dispensers need to be removed. The fuel operator shall have five working days to remove dispensers.

The Authority's fuel operator shall operate the aboveground storage tanks. Contractor shall provide Resident with ten working days' notice of when the aboveground storage tanks will be operational.

The contractor shall plan for and provide access to the travel plaza and temporary fuel systems for delivery vehicles (food, supplies, gas, diesel, maintenance, etc.).

The contractor shall plan the work so the Plaza is able to provide fuel service continuously throughout the Contract except for a single 24-hour period to switch from underground to temporary

fuel service and a second single 24-hour period to switch from temporary fuel to new permanent underground fuel service.

The following is a list of major milestone activities required:

- Supply and install above ground gas and diesel storage tanks, protective barrier, point of sale, and temporary lighting.
- Install temporary kiosk (supplied by the Authority's fuel operator) including providing power and communication, protective barrier, and temporary lighting.
- Test all temporary gas and diesel systems and prepare for bringing the temporary system online.
- Decommission (including but not limited to all systems disconnected, lines and tanks drained and purged and prepped for removal and disposal) and remove underground gas and diesel tanks and supply systems.
- Install underground gas and diesel tanks and supply system.
- Take receipt of and install vendor supplied gas and diesel dispensers.
- Install diesel canopy and automatic fire suppression system.
- Final testing and commissioning of the new permanent gas and diesel fueling system.
- Decommission above ground tanks (including but not limited to removing fuel from tanks and lines, purging and prepping tanks for transport, and additional requirements as required by tank leaser)
- Removal of the decommissioned aboveground storage tanks.

The contractor shall be responsible to decommission the aboveground tanks based on the requirements of the lease agreement and shall remove the tanks from MTA R/W at the conclusion of this.

The Contractor shall submit to the Authority a construction schedule which shall document that the Contractor has the necessary labor and equipment to work immediately and continuously at the project site once the first work area is closed to traffic. The intent of this specification is to minimize the amount of time for plaza disruption, while providing the Contractor sufficient time to complete the work in a diligent manner and to reopen the plaza parking, circulation, and fuel systems as prescribed by the project's Substantial Completion dates.

SPECIAL PROVISION

SECTION 203

EXCAVATION AND EMBANKMENT

203.01 Description

The following paragraph is added:

This work shall consist of cutting, removing and disposing of the full depth of existing bituminous concrete pavement at the approaches to the bridge structures within the limits of work as shown on the Plans or as approved by the Resident. The pavement shall be sawcut to the full depth of pavement at the limits of the excavation to provide a clean, vertical cut surface.

203.04 General

The following sentence is added to the end of the third paragraph.

There are no approved waste storage areas or waste areas within the Project limits unless shown on the Plans. Unsuitable materials shall be disposed of off-site in accordance with Subsection 203.06.

All excavations shall be accomplished in accordance with the applicable OSHA Standards. The Resident reserves the right to request the Contractor to prepare an excavation plan. This plan shall include, but not necessarily be limited to, the limit and depth of excavation, side slope, shoring, trench box and utility support.

203.10 Embankment Construction - General

The thirteenth and fourteenth paragraphs are deleted and replaced with the following:

All portions of the embankment shall be compacted in accordance with the designated embankment compaction requirements specified for the Project.

The existing slopes should be benched as shown on the drawings prior to placing additional fill. Embankment fill should be placed in lifts which extend laterally beyond the limits of the design side slopes such that the specified degree of compaction is achieved within the limits of the completed embankment. The slopes should then be trimmed back to design dimensions.

203.16 Winter Construction of Embankments

The word “core” is deleted from the first and second sentences in the first paragraph.

203.18 Method of Measurement

The following paragraphs are added:

There will be no additional payment for the required excavation plan, and costs shall be incidental to the Excavation items.

SPECIAL PROVISION

SECTION 203

EXCAVATION AND EMBANKMENT
(Contaminated Soil and Groundwater Management)

203.01 General

The work under this Specification shall be performed in conformance with 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 contaminated soil and/or water encountered during construction will be managed in a manner that protects worker health and safety, public welfare and the environment.

The work involved in this fuel system replacement project shall comply with the requirements of Maine Department of Environmental Protection, 06-096, Chapter 691 Rule for Underground Oil Storage Facilities. The Rule can be found on Maine DEP's website and through the Maine Turnpike upon request.

A representative from the Authority's Environmental Services Department and the Maine DEP shall be notified at least ten (10) working days prior to beginning any excavation of the contaminated soil. The Authority representative, or their designated consultant, shall be on site to observe and document the work. For unanticipated contaminated areas see Subsection 203.10.

203.02 Environmental Site Conditions

There is potential that the soil surrounding the tank, which is to be removed during the existing tank removal and the tank installations may contain petroleum impacted soil and groundwater. Additionally, petroleum impacted soils and groundwater may also exist at the gas and diesel island locations.

203.02 Potential Areas of Contamination

Identifying and Screening Contaminated Soil and Groundwater.

Excavated soils will be classified by Maine Turnpike's Environmental Consultant based on their visual and olfactory evidence of contamination and by accepted field screening. Field screening shall be performed according to the Maine DEP Appendix Q of 06-096, Chapter 691 Rule for Underground Oil Storage Facilities.

The soils will be classified by the Resident/Authority's Consultant according to Table 1, Section 5.4 of Maine DEP's Standard Operating Procedure #12, Managing Non-Hazardous Petroleum Contaminated Ground Water and Soil at UST Sites (SOP 12). Classifications are: "Minimally Contaminated", "Slightly Contaminated", or "Moderately to Substantially Contaminated"; briefly described below and in more detail in the Appendix – Maine DEP's SOP 12.

MINIMALLY CONTAMINATED soils shall have Photo-Ionization Detector (PID) field screening measurements indicating gasoline contamination of less than or equal to 10 parts per million (ppm) as measured in the soil headspace.

SLIGHTLY CONTAMINATED soils shall have PID field screening measurements greater than 10 ppm and less than the Leaching to Ground Water Field Cleanup Guideline or the oleophilic dye test for fuel oil contamination is, "slightly positive".

MODERATELY TO SUBSTANTIALLY CONTAMINATED soils shall have PID field screening measurements greater than the Leaching to Ground Water Field Cleanup Guideline or the oleophilic dye test for fuel oil contamination is "saturated or positive".

Handling and Disposition of Soil Materials

Soil material excavated during construction shall be handled as follows:

Soils classified as MINIMALLY CONTAMINATED can generally be used as construction fill on site. See Maine DEP SOP 12 for more information.

Soils classified as SLIGHTLY CONTAMINATED may be used onsite if test results are below the noted limits or they shall be properly disposed of according to test results and guidelines contained in Maine DEP SOP 12.

Soils classified as MODERATELY TO SUBSTANTIALLY CONTAMINATED shall not be excavated without prior approval by the Resident. The Contractor shall arrange and undertake disposal of these soils at a landfill or treatment facility licensed to accept petroleum contaminated special waste. The Contractor is responsible for all additional testing required by the disposal facility. These soils that cannot be disposed of within eight-hours of excavation shall be stored in a Temporary Secured Stockpile Area (as defined below). If the Contractor proposes other disposal or treatment options, the Contractor is solely responsible for obtaining the associated permits and approvals from all relevant Municipal, State and Federal agencies at no additional cost to the Authority.

The Authority's designated representative is responsible for signing any manifests or bills of lading required to transport and dispose of contaminated soil. All documentation and paperwork associated with the transport and disposal of soils (i.e., manifests/bills of lading, weigh slips, invoices, permits, etc.) shall be forwarded to the Maine Turnpike Authority's Environmental Services Coordinator at 2360 Congress Street, Portland, Maine 04102 within 30 days of the last shipment of soil to the licensed facility.

203.04 Secured Stockpile Area

Should the Contractor utilize a Temporary Secured Stockpile Area (hereafter referred to as a "Secured Stockpile"), they shall install a continuous one-foot (0.30 m) high compacted soil berm around the Secured Stockpile (see Secured Stockpile Area – Materials below for Specifications pertaining to soil berm, liner, cover and barricades). 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 by covering with a polyethylene. The Secured Stockpile and soil berm shall be enclosed within a perimeter of temporary concrete barriers or security fence. The area within the temporary concrete barriers (or security fence) shall be identified as a "restricted area" to prevent unauthorized access to the contaminated soils. The Contractor shall submit to the Resident a plan (sketch and sections) of the proposed secured stockpile area.

203.05 Secured Stockpile Area - Materials

The Contractor shall develop a soils management plan for the project for any "contaminated" soils stored onsite as part of the health and safety plan. As part of the plan, the Contractor shall submit to the Resident a plan (sketch and sections) of the proposed secured stockpile areas. If soils are stored on site, the following will be required as a minimum or as directed by the Resident:

A. Polyethylene. Polyethylene used for liner and cover 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 Subsection 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 Subsection 652.05.

203.06 Health and Safety/Right-to-Know

Contractors and subcontractors are required to notify their workers of the history of the area and contamination that may be present and to be alert for evidence of contaminated soil and groundwater.

The Contractor shall prepare a site specific Health and Safety Plan (HASP) for its workers and subcontractors who may work in the contaminated area of the site. A Qualified Health and Safety Professional shall complete the HASP. The HASP shall be submitted to the Authority in accordance with the Submittal section below. The Qualified Health and Safety Professional will be an expert in field implementation of the following federal regulations:

29 CFR 1910.120 or 29 CFR 1926.65	Hazardous Waste Operations, and 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

The Contractor shall designate a person to provide direct on-site supervision of the work in the contaminated area. This person shall have the training and medical surveillance under OSHA 1910.120 (e) and (f) respectively, as detailed above and in addition be qualified as a construction Competent Person [OSHA 1926.32 (f) and (l)]. It is the responsibility of this designated 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 insure that corrective measures are taken.

Work inside contaminated trench sections may be subject to OSHA's permit-required confined space regulations under 29 CFR 1910.146.

Submittals. The Contractor shall submit for Authority and the Authority's Environmental Services Coordinator, review a site specific Health and Safety Plan (HASP) to the Resident at least two weeks in advance of any excavation work on the Project.

Health and Safety Monitoring. Within the contaminated area of the Project, the Contractor's designated 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.

203.07 Dewatering

Groundwater may be encountered during excavation for the tanks and utility work. If encountered and should its removal become necessary to complete work, it will be treated as "contaminated" water. The Contractor shall inform the Resident before any dewatering commences. The "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; including Maine DEP 06-096, Chapter 691 Rule for Underground Oil Storage Facilities.

203.08 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 sized appropriately for contractor's storage, treatment, and disposal process.

203.09 Dust Control

The Contractor shall employ dust control measures to minimize the creation of airborne dust during construction within the contaminated area. 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.

203.10 Unanticipated Contamination.

If the Contractor encounters previously undiscovered contamination or potentially hazardous conditions related to contamination, the Contractor shall suspend work and secure the area. The Contractor will then notify the Resident immediately. The Resident will then notify the Authority. 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 the groundwater. The area of potential hazard shall be secured to minimize health risks to workers and the public and to prevent a release of contaminants into the environment. The source of the suspected contamination will be evaluated by the Resident (or MTA's Environmental consultant). As appropriate, the Resident will notify the Maine Department of Environmental Protection's Response Services Unit in Augusta and the Authority's Environmental Services Coordinator. The Cumberland 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, restart work in accordance with the procedures of this Special Provision.

203.11 Method of Measurement.

Health and Safety Plan (HASP) will be measured for payment by the lump sum.

Disposal/Treatment of Special Excavation will be measured for payment by the ton.

Disposal/Treatment of Groundwater will be measured for payment by the gallon.

203.012 Basis of Payment.

Health and Safety Plan (HASP) will be paid for at the Contract lump sum price which payment shall be full compensation for development of an approved Health and Safety Plan (HASP) and providing health and safety equipment and personnel.

Disposal/Treatment of Special Excavation (contaminated Surplus soils) will be paid for at the Contract unit price per ton which payment shall be full compensation for excavating, loading, hauling, treatment, placing, grading and compacting, and all necessary equipment and labor. Only soil excavated from within the area shown on the plans or as designated by the Resident will be paid under this pay item.

Disposal/Treatment of Contaminated Groundwater will be paid for at the Contract unit price per Gallon which payment shall be full compensation for pumping excavations, loading, hauling, treatment, and all necessary equipment and labor. Only groundwater pumped, treated and disposed of properly from the site will be paid under this pay item. Any water that is not required to be treated will not be paid for. Contractor is to propose and submit for review measurement and calibration of meter for pumped water.

There will be no measurement for identification and environmental screening of contaminated soil material or groundwater (this will be done by the Resident or Authority's Environmental Services Coordinator).

Construction of a Temporary Secured Stockpile Area, or groundwater holding tank, if necessary, will not be measured separately for payment, but shall be incidental to Items 203.2312, 203.2333, and 203.2334.

Hauling Surplus contaminated soils to the Temporary Secure Stockpile area or placement and removal of Surplus contaminated soils in or out of the Temporary Secure Stockpile area will not be measured separately for payment but shall be incidental to Items 203.2312 and 203.2333.

All hauling and any subsequent management/placement of contaminated soils and/or groundwater shall be incidental to Items 203.2312, 203.2333, and 203.2334.

There will be no separate measurement for additional laboratory testing of contaminated soil that is required by the landfill or treatment facility. Testing shall be incidental to Item 203.2333, and 203.2334.

Payment will be made under:

Pay Item		Pay Unit
203.2312	Health and Safety Plan	Lump Sum
203.2333	Disposal/Treatment of Special Excavation	Ton
203.2334	Disposal/Treatment of Groundwater	Gallon

SPECIAL PROVISION

SECTION 206

STRUCTURAL EXCAVATION

206.02 Construction Methods

The following paragraphs are added:

There are no approved waste storage areas or waste areas within the Project limits. Unsuitable materials shall be disposed of off-site in accordance with Subsection 203.06.

SPECIAL PROVISION

SECTION 401

HOT MIX ASPHALT PAVEMENT

Section 401 of the Maine Turnpike Authority 2016 Supplemental Specifications is deleted in its entirety and replaced with the following:

401.01 Description

The Contractor shall furnish and place one or more courses of Hot Mix Asphalt Pavement (HMA) on an approved base in accordance with the Contract documents and in reasonably close conformity with the lines, grades, thickness, and typical cross sections as shown on the Plans or established by the Resident. The Authority 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 Section 401 of these Specifications, and the MaineDOT Policies and Procedures for HMA Sampling and Testing. A Quality Control Plan (QCP) is required.

401.02 Materials

Aggregates for HMA Pavements Coarse Aggregate and fine aggregate for HMA pavements shall be graded such that when combined in the proper proportions, including filler if required, the resultant blend will meet the composition of mixture for the type of pavement specified. 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

Mainline Surface HMA Coarse aggregate: Each individual aggregate stockpile shall conform to the following requirements. The material retained on the No. 4 sieve, shall consist of angular fragments obtained from crushed quarry stone and be free of dirt or other objectionable materials. Coarse aggregate shall have a Micro-Deval value of 15.0 percent or less as determined by AASHTO T 327. The crushed stone shall have a maximum of 1.5% material finer than the No. 200 mesh when tested in accordance with AASHTO T-11. Flat and elongated particles shall not exceed a maximum of 8% at a 5:1 ratio in accordance with ASTM D-4791. Coarse aggregate angularity shall be a minimum of 95/90 in accordance with AASHTO T-335.

Mainline Surface HMA Fine aggregate: Each individual aggregate stockpile shall conform to the following requirements. The material passing the No. 4 sieve, shall be crushed manufactured sand free from dirt, clay balls, or other objectionable material. Natural sand may be incorporated into the mix at a rate no greater than 10 percent by weight of total aggregate. The unconfined void content of the fine aggregate, excluding natural sand, shall be a 45 minimum value when tested in accordance with AASHTO T-304, method A. AASHTO T-176 sand equivalent value shall be 45 minimum. The

fine aggregate, excluding RAP, shall have a Micro-Deval of 15.0 percent or less when tested in accordance with ASTM D-7428.

Each individual stockpile for both coarse and fine aggregates shall be completely separated from any other stockpile and be constructed such that the material is visually homogenous and maintains consistent consensus quality test results. A documented testing program and records of all test results shall be maintained for all materials and subject to inspection by the Authority.

Asphalt Low Modulus Joint Sealer: Asphalt Low Modulus Joint Sealer shall be a modified asphalt and rubber compound designed for sealing and improving the strength and performance of the base asphalt cement and shall conform to ASTM D6690 Type IV and the following specifications:

Cone Penetration	90-150
Flow @ 60°C [140ºF]	3.0mm [1/8 in] max
Bond, non-immersed	Three 12.7mm [½ in] specimens pass 3 cycles @ 200% extension @ -29°C [-20ºF]
Resilience, %	60 min
Asphalt Compatibility, ASTM D5329	pass*

* There shall be no failure in adhesion, formation of any oily exudate at the interface between the sealant and asphaltic concrete or other deleterious effects on the asphaltic concrete or sealant when tested at 60°C [140ºF].

The contractor shall provide the Resident or authorized representative with a copy of the material manufacturer's recommendations pertaining to heating, application, and reheating prior to the beginning of operations or the changing of materials.

401.021 Recycled Asphalt Materials

Recycled Asphalt Pavement (RAP) may be introduced into the mixture at percentages approved by the Authority. If approved by the Authority, the Contractor shall provide documentation stating the source, average test results for average residual asphalt content, and stockpile gradations showing RAP materials have been sized to meet the maximum aggregate size requirements of each mix designation. The Authority will obtain samples for verification and approval prior to its use.

In the event that RAP source or properties change, the Contractor shall notify the Authority of the change and submit new documentation stating the new source or properties. A plant produced test batch meeting all requirements including Hamburg Wheel Tracker results.

RAP shall meet the following requirements:

Classification	**Asphalt Content Standard Deviation**	**% Passing #200 Sieve Standard Deviation**	**% Passing #200 Sieve / Asphalt Content Ratio**	Residual Aggregate Micro Deval Loss Value
Class II	≤ 0.5	≤ 1.0	≤ 2.8	≤ 18.0
Class I	≤ 0.3	≤ 0.5	≤ 1.8	≤ 18.0

401.03 Composition of Mixtures

HMA pavement mixtures for base, intermediate, shim and local road bridge projects shall be a currently approved MDOT design unless otherwise noted. A maximum of 20% RAP may be used. VMA during production shall meet the requirements listed in Table 1.

HMA pavement mixtures for Mainline surface paving projects shall conform to the following requirements:

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). The Contractor may use a maximum of 15 percent Class I reclaimed asphalt pavement (RAP) or a maximum of 10 percent Class II RAP in any mainline surface course.

The Contractor shall submit a job mix formula (JMF) developed for each specified mixture at least 30 days prior to placement.

The JMF shall establish a single percentage of aggregate passing each sieve size within the limits shown in Subsection 703.09. The mixture shall be designed and produced, including all production tolerances, to comply with the allowable control points for the particular type of mixture as outlined in Subsection 703.09. The JMF shall state the original source, gradation, and percentage to be used of each portion of the aggregate and mineral filler if required. It shall also state the proposed PGAB content, the name and location of the refiner, the supplier, the source of PGAB submitted for approval, the type of PGAB modification if applicable, and the location of the terminal if applicable.

In addition, the Contractor shall provide the following information with the proposed JMF:

- Properly completed JMF indicating all mix properties (Gmm, VMA, VFB, etc.).
- Stockpile Gradation Summary.
- Contractor generated test reports for individual aggregate consensus properties. Test results must have been generated within six months of JMF submission
- Design Aggregate Structure Consensus Property Summary.
- Design Aggregate Structure Trial Blend Gradation Plots (0.45 power chart).

- Trial Blend Test Results for at least three different aggregate blends. (Not required if the supplier has mix history with the selected design aggregate blend)
- Selected design aggregate blend.
- Test results for the selected design aggregate blend at a minimum of three binder contents.
- Test results for final selected blend compacted to Nmax.
- PGAB certification from the supplier
- Specific Gravity for the PGAB to be used.
- Recommended mixing and compaction temperatures from the PGAB supplier.
- Data Sheets (SDS) For PGAB.
- Asphalt Content vs. Air Voids trial blend curve.
- Test report for Contractor's Verification sample.
- Summary of RAP test results (if used), including count, average and standard deviation of binder content and gradation. This should be a MaineDOT generated report showing approval.

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, 75 ton for fine aggregate stockpiles before the JMF may be submitted. The Authority shall obtain samples for laboratory testing. The Contractor shall also make available to the Authority 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. Before the start of paving, the Contractor and the Authority's representative shall test a production sample in the Contractor's laboratory for evaluation. If the Authority finds the mixture acceptable, an approved JMF will be forwarded to the Contractor. The Authority will then notify the Contractor that paving may commence. 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 within 24 hours of receipt of the first Acceptance test result for an individual JMF. Adjustments will be allowed of up to 2% on the percent passing the 2.36 mm sieve through the 0.075 mm and 3% on the percent passing the 4.75 mm or larger sieves. Adjustments will be allowed on the %PGAB of up to 0.2 percent. Adjustments will be allowed on GMM of up to 0.010.

The contractor may request to carry over an approved mix design from the previous calendar year. The Authority will evaluate the request based on the performance and production history from the previous season. If the request is approved by the Authority no aggregate material, RAP, or aim changes will be granted for a carryover mix design and the initial design must not be older than the previous paving season.

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 except natural sand 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. Natural sand may be adjusted up to 5 percent from the amount listed on the JMF but shall not exceed 10% by weight of total aggregates. The cold feed percentage for RAP may be reduced up to five 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.

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}	19	12.5	9.5	4.75		
3 to <30	≤89.0	96.0	≤98.0	13.5	14.5	15.5	15.5	65-80	0.6-1.2

As part of the JMF submittal the Contractor shall provide the Authority with Hamburg Wheel Tracker test results in accordance with AASHTO T324. The results shall be generated by a third-party independent testing laboratory as approved by the Authority. The test results for each individual specimen as well as the average shall meet the requirements of Table 1A

TABLE 1A
HAMBURG WHEEL TRACKER REQUIREMENTS

Specified PG Binder Grade	Test Temperature (ºC)	Maximum Rut Depth (mm)	Minimum Number of Passes	Minimum Allowable SIP*
64-28	45	12.5	20,000	15,000
64E-28	48	8.0	20,000	15,000
70E-28	50	6.3	20,000	15,000

401.031 Warm Mix Technology

The Contractor may place Hot Mix Asphalt Pavement produced with an accepted WMA technology if approved by the Authority. 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, submitted to the Authority for approval prior to any work. Weather and seasonal limitations as outlined in section 401.06 may be reduced by a maximum 5ºF with the use of WMA except for HMA being placed over bridge deck membrane.

401.04 Temperature Requirements

After the JMF is established, the temperatures of the mixture shall conform to the following tolerances:

- In the truck at the mixing plant – allowable range 275° to 325°F.
- At the paver – allowable range 275° to 325°F.
- Or the recommendations, approved by the Authority, from the Asphalt Binder supplier.
- Any HMA placed over bridge deck membrane shall have a minimum temperature of 300° F measured directly behind the screed in the uncompacted mat.

The JMF and the mix subsequently produced shall meet the requirements of Table 1.

No vehicular loads shall be permitted on newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. The newly paved area may be opened to traffic after the internal temperature of the pavement has cooled to 120° F. The Resident will test the internal temperature of the pavement and shall be the sole judge as to the opening to traffic. The period of time before opening to traffic may be extended at the discretion of the Resident. The lane closure may not be removed until the internal temperature has cooled to 120° F.

401.05 Performance Graded Asphalt Binder

Unless otherwise noted in Special Provision Section 403, Hot Bituminous Pavement, PGAB shall be 64-28. The PGAB shall meet the applicable requirements of AASHTO M320 - Standard Specification for PGAB. The Contractor shall request approval from the Authority for a change in PGAB supplier or source by submitting documentation stating the new supplier or source a minimum of 24-hours prior to the change. If the PGAB supplier or source is changed, the Contractor shall make efforts to minimize the occurrence of PGAB co-mingling.

401.06 Weather and Seasonal Limitations

The Contractor may place Hot Mix Asphalt Pavement for use other than a traveled way wearing course, provided that the air temperature as determined by an approved thermometer (placed in the shade at the paving location) is 45°F or higher and the area to be paved is not frozen. The Contractor may place Hot Mix Asphalt Pavement as traveled way wearing course, provided the air temperature determined as above is 50°F or higher. For the purposes of this Section, the traveled way includes truck lanes, ramps, shoulders, approach roads and auxiliary lanes. The atmospheric temperature for all courses on bridge decks shall be 50°F or higher.

Hot Mix Asphalt Pavement used for curb, driveways, sidewalks, islands, or other incidentals is not subject to seasonal limitations, except that conditions shall be satisfactory for proper handling and finishing of the mixture. All mixtures used for curb, driveways, sidewalks, islands, or other incidentals shall conform to Subsection 401.04, Temperature Requirements. Unless otherwise specified, the Contractor shall not place Hot Mix Asphalt Pavement on a wet or frozen surface and the air temperature shall be 40°F or higher.

On all sections of overlay with wearing courses one inch thick or less, the wearing course for the travel way and adjacent shoulders shall be placed provided the air temperature is determined as above 50°F or higher.

401.07 Hot Mix Asphalt Plant

401.071 General Requirements

HMA plants shall meet the requirements of the 2020 Maine Department of Transportation Standard Specifications section 401.07 and maintain current approval from the Maine Department of Transportation.

401.08 Hauling Equipment Trucks for Hauling Hot Mix Asphalt

Trucks for hauling Hot Mix Asphalt Pavement shall have tight, clean, and smooth metal dump bodies, which have been thinly coated with a small amount of approved release agent to prevent the mixture from adhering to the bodies. Solvents based agents developed to strip asphalts from aggregates will not be allowed as release agents.

All truck dump bodies shall have a cover of canvas or other water repellent material capable of heat retention, which completely covers the mixture. The cover shall be securely fastened on the truck, unless unloading.

All truck bodies shall have an opening on both sides, which will accommodate a thermometer stem. The opening shall be located near the midpoint of the body, at least 12 inches above the bed.

The undercarriage of haul units actively hauling HMA to the site shall be relatively free of dust / mud agglomerations. Haul units found to be contaminating the paving surface shall be removed from the site and cleaned prior to returning.

The contractor shall supply enough haul units such that paving is continuous and without any stops or paver speed changes during the installation of ramp or mainline wearing courses utilizing an MTV. or any course placed on a bridge deck. The contractor will be charged a fee of $1,000. for every occurrence if paving is either stopped or the paver must slow down to avoid stopping due to inadequate number of haul units at the sole discretion of the Authority.

401.09 Pavers

Pavers shall be self-contained, self-propelled units with an activated screed (heated if necessary) capable of placing courses of Hot Mix Asphalt Pavement in full lane widths specified in the Contract on the mainline, shoulder or similar construction.

On projects with no price adjustment for smoothness, pavers shall be of sufficient class and size to place Hot Mix Asphalt Pavement over the full width of the mainline travel way with a 10 feet minimum main screed with activated extensions.

The Contractor shall place Hot Mix Asphalt Pavement on the mainline with a paver using an automatic grade and slope controlled screed, unless otherwise authorized by the Authority. The controls shall 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 super elevated 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 mainline projects.

The Contractor shall operate the paver in such a manner as to produce a visually uniform surface texture and a thickness within the requirements of Subsection 401.101, Surface Tolerances. The paver shall have 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. The screed assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. 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. The forward operating speed of the paver shall be limited based on the course being placed. A shim or leveling course shall have a maximum speed of 50 feet per minute (fpm). Any base, intermediate, or surface course shall have a maximum paver speed of 45 fpm. The limited speed is not to be calculated on an average basis over time but shall be the actual limitation at any moment during the paving operation.

The Contractor shall have the paver at the Project site sufficiently before the start of paving operations to be inspected and approved by the Authority. The Contractor shall repair or replace any paver found worn or defective, either before or during placement, to the satisfaction of the Authority. Pavers that produce an unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA on MTA projects. On a daily basis, the Contractor shall perform density testing across the uncompacted mat being placed, at 12 inch intervals. If the values vary by more than 2.0 percent from the mean, the Contractor shall make adjustments 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.

401.091 Material Transfer Vehicle (MTV)

When required by Special Provision Section 403, the paver shall be supplied mixture by a material transfer vehicle (Roadtec SB2500 or approved equal) capable of receiving and storing bituminous mixture from haul trucks, remixing, and delivering the mix to the paver hopper in a consistently uniform manner.

The MTV shall operate as an independent unit not attached to the paver. It shall be a commercially manufactured unit specifically designed to transfer the hot mix from haul trucks to the paver without depositing mix on the roadway.

Also required is a separate hopper with a capacity of 18 mg (20 Ton) that shall be inserted into the regular paving hopper.

The MTV shall be designed so that the mix receives additional mixing action.

The MTV and the hopper insert will not be measured separately for payment, but shall be incidental to the various Hot Mix Asphalt items.

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 surface. The use of rollers, which result in crushing of the aggregate or in displacement of the HMA will not be permitted. Any Hot Mix Asphalt Pavement that becomes loose, broken, contaminated, shows an excess or deficiency of Performance Graded Asphalt Binder, or is in any other way defective shall be removed and replaced at no additional cost with fresh Hot Mix Asphalt Pavement, 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 Authority. Rollers that produce grooved, unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA on MTA projects.

The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option, provided Specification densities are attained and with the following requirements:

a. At least one roller shall be a minimum 16 ton pneumatic-tired. Pneumatic-tired rollers shall be equipped with skirting to minimize the pickup of HMA materials from the paved surface. The contractor shall provide a weigh slip for the rubber tire being used.

b. Compaction with a vibratory or steel wheel roller shall precede pneumatic-tired rolling, unless otherwise authorized by the Authority.

c. Vibratory rollers shall not be operated in the vibratory mode when checking or cracking of the mat occurs, or 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.

401.101 Surface Tolerances

The Authority will check surface tolerance utilizing the following methods:

a. A 16 ft straightedge or string line placed directly on the surface, parallel to the centerline of pavement.

b. A 12 ft straightedge or string line placed directly on the surface, transverse to the centerline of pavement.

The allowable tolerance shall be ¼ inch in the segments as described above. This includes fresh HMA joints as well as new longitudinal HMA adjoining pavements. The tolerance shall also apply to the cross slope in a single paver width with the exception that in no case shall the pavement surface in the single paver width be inverted resulting in a depression as measured transverse to the direction of travel. The Contractor shall correct variations exceeding ¼ inch by removing defective work and replacing it with new material as directed by the Authority. The Contractor shall furnish a 12 foot straightedge for the Authority's use.

401.11 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. Tack coat shall conform to the requirements of Section 409, Bituminous Tack Coat, Section 702, Bituminous Material, and all applicable sections of the Contract.

The contractor will be permitted to be generally innovative in methods to dry existing wet or damp pavement. Any method which causes damage or burning of the existing pavement, or which causes debris to fly into traffic shall be discontinued.

Section 401.111 Layout

The contractor shall layout the site prior to any pavement course or final striping. Layout shall be achieved by physical measurements obtained every 50' along the length to be paved or striped from a fixed reference point. The contractor shall transfer the measurements to the pavement surface every 50' and apply a paint mark at each location. The marks shall then be connected by a smoothed string line and subsequent paint marks applied along the string at no greater than 10' intervals. The Resident will inspect the layout line before associated activities may begin.

401.12 Hot Mix Asphalt Documentation

The Contractor and the Authority shall agree on the amount of Hot Mix Asphalt Pavement that has been placed each day. HMA Pavement yield shall be calculated and monitored by both the resident and the paving foreman. Yield calculations shall be communicated in real time between both parties throughout the paving operations. All delivery slips shall conform to the requirements of 401.073.

401.13 Preparation of Aggregates

The Contractor shall dry and heat the aggregates for the HMA to the required temperature. The Contractor shall properly adjust flames to avoid physical damage to the aggregate and to avoid depositing soot on the aggregate.

401.14 Mixing

The Contractor shall combine the dried aggregate in the mixer in the amount of each fraction of aggregate required to meet the JMF. The Contractor shall measure the amount of PGAB and introduce it into the mixer in the amount specified by the JMF.

The Contractor shall produce the HMA at the temperature established by the JMF.

The Contractor shall dry the aggregate sufficiently so that the HMA will not flush, foam excessively, or displace excessively under the action of the rollers. The Contractor shall introduce the aggregate into the mixer at a temperature of not more than 25°F above the temperature at which the viscosity of the PGAB being used is 0.150 Pa·s (Pascal-second).

The Contractor shall store and introduce into the mixer the Performance Graded Asphalt Binder at a uniformly maintained temperature at which the viscosity of the PGAB is between 0.150 Pa·s and 0.300 Pa·s. The aggregate shall be coated completely and uniformly with a thorough distribution of the PGAB. The Contractor shall determine the wet mixing time for each plant and for each type of aggregate used.

401.15 Spreading and Finishing

On 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. Solvent based agents developed to strip asphalts from aggregates will not be allowed as release agents.

On roads opened to two-way traffic, the Contractor shall place each course over the full width of the traveled way section being paved that day, unless otherwise noted by the Authority in Section 403, Hot Mix Asphalt Pavement.

In addition, hot mix asphalt pavement placed on bridges shall also conform to Section 508.04 and the following requirements.

a. 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.

b. The top course shall not be placed until the bottom course has cooled sufficiently to provide stability.

c. The Contractor will not be required to cut sample cores from the compacted pavement on the bridge deck, unless otherwise directed by Special Provisions.

d. 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 curb. The area to be sealed shall be clean, dry and the surface shall be at ambient temperature.

e. 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. The sealer shall be applied after 30 days of cure time on the new HMA placed.

f. The atmospheric temperature for all courses placed on bridge decks shall be 50°F or higher.

g. A pneumatic tire roller shall be used on the bridge deck membrane just prior to paving.

401.16 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 Authority. 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 Authority.

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 Authority.

401.162 Voids

The HMA will be accepted for percent air voids on a sublot basis. Percent air voids will be determined in accordance with AASHTO T 312. Point of sampling will be from the truck at the plant. A sublot will consist of 500 tons. The number of samples per day will be computed as one for every 500 tons plus one for any additional fractional sublot that is equal to or greater than 100 tons or as directed by the Resident. There shall be a minimum of one sublot per day per JMF. One

sample shall be taken and tested for each 500 tons of production or portions thereof. Full payment will be made for each 500 tons of production that meets the specified void range of 2.5 to 5.5 percent.

Payment reduction will be applied to each sublot (500 tons) that falls outside of this range. See Subsection 401.21.

Section 401.163 PGAB Content and Aggregate Gradation

The HMA will be accepted for PGAB content and Aggregate Gradation on a sublot basis. PGAB content will be determined in accordance with AASHTO T 308. Aggregate Gradation will be determined in accordance with AASHTO T 30. Point of sampling will be from the truck at the plant. A sublot will consist of 500 tons. The number of samples per day will be computed as one for every 500 tons plus one for any additional fractional sublot that is equal to or greater than 100 tons or as directed by the Resident. There shall be a minimum of one sublot per day per JMF.

Payment reduction will be applied to each sublot (500 tons) that falls outside the allowable limits. See Subsection 401.21.

401.164 Density

Pavement density will be determined by comparing the density of six-inch diameter full depth cores (for the course being laid) taken from the compacted pavement to the Theoretical Maximum Density of that core. Core locations shall be by random samples in conformance with ASTM-D979 & D3665. The Contractor shall supply a masonry saw with a 12 inch diamond wet cutting saw blade capable of cutting the six inch diameter cores. The resident shall determine if trimming is required and the core will be labeled as such.

For determination of pavement density, core samples six inches in diameter, for the full depth of the course being laid, shall be taken by the Contractor from the mixture incorporated in the work after finishing operations have been completed and the pavement has cooled to 70^{o}F. Ice or dry ice shall be used to reduce temperature as necessary. All core samples shall be inspected, measured, and sealed in an approved transport container by the Resident. The contractor shall deliver the sealed container to the laboratory for testing by the Authority's representative.

Vertical surface of the core area shall be coated with rubberized joint sealer prior to refilling with bituminous mixture. Cores will not be cut for shim pavement.

The joint sealer, bituminous mixture and the labor for obtaining these samples in the field and restoring the surface shall be furnished without charge by the Contractor. The joint sealant shall conform to the material requirements for Asphalt Low Modulus Joint Sealer and shall be incidental to the pavement items. Care must be exercised to avoid excess joint material on top of the finish mat and at the bottom of the joint.

No additional course shall be constructed on a course until the density of the sample has been established and approved.

The densities of the completed pavement shall be 92.5 to 97.0 percent of the theoretical maximum density obtained.

The pavement will be accepted for density on a sublot basis. A sublot will consist of 500 tons. The number of cores per day will be computed as one for every 500 tons plus one for any portion that does not equal 500 tons or as directed by the Resident. There shall be a minimum of one sublot per day per JMF.

Each sublot will be evaluated separately and full or partial payment will be made based on the results of tests performed on the cores.

Payment reduction will be applied to each core that has a density outside of the allowable range (92.5 to 97.0). See Subsection 401.21.

401.165 Longitudinal Joint Density

When noted in Special Provision Section 403, the Authority will measure the pavement density of longitudinal joints between adjoining mainline travel lanes in both the unconfined and confined condition as determined by the days paving operation. Only joints constructed between travel lanes will be tested, joints between a travel lane and a shoulder are excluded from sampling.

Pavement joint density will be determined by comparing the density of six-inch diameter full depth cores (for the course being laid) taken from the compacted pavement to the Theoretical Maximum Density of that core. The edge of the core nearest the joint shall be a 1" offset from the visible longitudinal joint as determined by the resident. Longitudinal core locations shall be determined by random sampling in conformance with ASTM-D979 & D3665. The Contractor shall supply a masonry saw with a 12 inch diamond wet cutting saw blade capable of trimming the underside of the six inch diameter cores if necessary. The resident shall determine if trimming is required and the core will be labeled as such.

For determination of pavement joint density, core samples six inches in diameter, for the full depth of the course being laid, shall be taken by the Contractor from the mixture incorporated in the work after finishing operations have been completed and the pavement has cooled to 70°F. Ice or dry ice shall be used to reduce temperature as necessary.

Vertical surface of the core area shall be coated with rubberized joint sealer prior to refilling with bituminous mixture. Cores will not be cut for shim pavement.

The joint sealer, bituminous mixture and the labor for obtaining these samples in the field and restoring the surface shall be furnished without charge by the Contractor. The joint sealant shall conform to the material requirements for Asphalt Low Modulus Joint Sealer and shall be incidental to the pavement items. Care must be exercised to avoid excess joint material on top of the finished mat and at the bottom of the joint.

No additional course shall be constructed on a course until the density of the sample has been established and approved.

The minimum density of the completed pavement shall be 92.0 percent of the theoretical maximum density obtained. Two consecutive failing tests shall result in production shut down. Prior

to resuming paving operations, the contractor quality control unit shall satisfy the Authority that the paving operation will produce joint densities in compliance with the Specifications.

The pavement will be accepted for joint density on a sublot basis. A sublot will consist of 500 tons. The number of cores per day will be computed as one for every 500 tons plus one for any portion that does not equal 500 tons or as directed by the Resident. There shall be a minimum of one sublot per day per JMF.

Each sublot will be evaluated separately and full or partial payment will be made based on the results of tests performed on the cores.

Payment reduction will be applied to each sublot that has a density lower than 92.0% as outlined below.

PERCENT COMPACTION	PERCENT PAY
92.0 or greater	100
91.9 to 90.0	95
89.9 to 88.5	90
88.4 or less	75

401.17 Joints

The Contractor shall construct wearing course transverse and longitudinal joints in such a manner that minimum tolerances shown in Subsection 401.101, Surface Tolerances, are met when measured with a straightedge.

The paver shall always maintain a uniform head of HMA during the joint construction.

The HMA shall be free of segregation and meet temperature requirements outlined in Subsection 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.

When required by Special Provision Section 403, Mainline Longitudinal joints shall be constructed as notched-wedge joint and constructed in a manner that will best ensure joint integrity.

The installation of the longitudinal joint shall be straight and true to the direction of travel and be located within 1-1/2" of the layout line. Deviations and or crossing back and forth over the layout line shall not be permitted and any such deviations or meandering shall be corrected by saw cutting the affected area prior to placing the adjacent lane with no additional cost to the Authority. Methods or activities that prove detrimental to the construction of straight, sound longitudinal joints will be discontinued.

Extra care shall be taken to insure satisfactory vertical joints in the pavements. On the notched-wedge joints a double layer of tack shall be applied. The Contractor shall apply a coating of joint sealant immediately before paving all cold joints (temperatures less than 120^{o}F) to the vertical face of the wearing surface if they are not a notched-wedge joint unless otherwise directed by the

Resident. A heavy application of tack coat shall be applied to the vertical face of all cold joints on lower lifts. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Authority 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 (1) working day. Joint sealer shall conform to the material requirements for Asphalt Low Modulus Joint Sealer.

Where pavement under this Contract joins an existing pavement or when the Authority directs, the Contractor shall cut the existing pavement along a smooth line, producing a neat, even, vertical joint. The Authority 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.

401.18 Quality Control

The Contractor shall submit for approval and operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the contract requirements. The QCP shall meet the requirements of Section 106.4 – Quality Control and this Section. The Contractor shall not begin paving operations until the Authority approves the QCP in writing. Prior to placing any mix, the Authority 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 QC random numbers to be used on the project shall be provided to the Resident.
The Authority's random numbers for Acceptance testing shall be generated and on file with the Resident and the Project Manager. All personnel of the Authority 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.

The QCP shall address any items that affect the quality of the Hot Mix Asphalt Pavement including, but not limited to, the following:

a. JMF(s)

b. Hot mix asphalt plant details

c. Stockpile Management (to include provisions for a minimum 2 day stockpile). Detailing how the stockpiles will be built, labeled, and kept separated from each other. Also provide a detailed description of the aggregate consensus quality testing program including all pertinent qualities, frequency of testing, in house procedures for determining material acceptability and addressing deficient test results.

d. Make and type of paver(s)

e. Make and type of rollers including weight, weight per inch of steel wheels, and average contact pressure for pneumatic tired rollers

f. Name of QCP Administrator, and certification number

g. Name of Process Control Technician(s) and certification number(s)

h. Name of Quality Control Technician(s) and certification number(s)

i. Mixing and transportation including process for ensuring that truck bodies are clean and free of debris or contamination that could adversely affect the finished pavement

j. Testing plan

k. Laydown operations including longitudinal joint construction, procedures for avoiding paving in inclement weather, type of release agent to be used on trucks tools and rollers, compaction of shoulders, tacking of all joints, methods to ensure that segregation is minimized, procedures to determine the maximum rolling and paving speeds based on best engineering practices, and provide these results, as well as past experience in achieving the best possible smoothness of the pavement. Solvent based agents developed to strip asphalts from aggregates will not be allowed as release agents

l. Examples of Quality Control forms including a daily plant report, daily paving report, control charts, and delivery slip template for any plant to be utilized.

m. Silo management and details (can show storage for use on project of up to 36 hours)

n. Provisions for varying mix temperature due to extraordinary conditions or production limitations. If a warm-mix technology is utilized, a proposed target production range (not to exceed 50 F) will be provided for each mix design.

o. Name and responsibilities of the Responsible onsite Paving Supervisor

p. Method for calibration/verification of Density Gauge

q. A note that all testing will be done in accordance with AASHTO and the Maine DOT Policies and Procedures for HMA Sampling and Testing

r. A detailed description of RAP processing, stockpiling and introduction into the plant as well as a note detailing conditions under which the percent of RAP will vary from that specified on the JMF

s. A detailed procedure outlining when production will be halted due to QC or Acceptance testing results

t. A plan to address the change in PGAB source or supplier and the potential co-mingling of differing PGAB's.

u. Provisions for how the QCP will be communicated to the Contractor's field personnel

v. The contractor shall provide a detailed plan outlining how the number of haul units will be determined and supplied to the project to prevent the paver from stopping on mainline wearing course and bridge deck paving over membrane

The QCP shall include the following technicians together with following minimum requirements:

a. QCP Administrator – A qualified individual shall administer the QCP. 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 its designee in the QCP Administrator's absence) shall be available to communicate with the Authority at all times. The QCP Administrator shall be certified as a Quality Assurance Technologist certified by the New England Transportation Technician Certification Program (NETTCP).

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 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 property 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 QCT shall be on site during paving operations performing quality control activities. QCT's shall not act as equipment operators, trainers or laborers. 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.

401.191 Inspection/Testing

Aggregates used in mainline surface mixes shall be tested at the following frequencies during mix production:

Test	Frequency	Test Method
Coarse Aggregates		
Sieve Analysis	1 per week	AASHTO T27/T11
Specific Gravity	1 per 10000 Mix Ton minimum of 1test	ASHTO T85

Micro Deval	1 per 10000 Mix Ton minimum of 1 test	AASHTO T327
Fine Aggregates		
Sieve Analysis	1 per week	AASHTO T27/T11
Specific Gravity	1 per 10000 Mix Ton minimum of 1test	ASHTO T84
Micro Deval	1 per 10000 Mix Ton minimum of 1test	ASTM D-7428

All quality control testing at the plant and paving site for bituminous concrete paving shall be provided by the Contractor and will be incidental to the various items of the Contract. Quality control testing to verify the job mix formula at the plant shall be comprised of a sample taken and tested for each 500 tons of production. The plant will be shut down for two consecutive out of Specification test results for VMA, VFB, Fbe, PGAB content, gradation, and/or voids. The consecutive failures need not be on the same property. Prior to resuming paving operations, the plant quality control unit shall satisfy the Authority that the plant production is in compliance with the Specifications. The plant, at no additional cost to the Authority, shall assign qualified quality control staff personnel and have an on-site laboratory equipped to perform all tests.

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 mixture as outlined in Table 1 of Section 703.09.

CONTROL LIMITS	
Property	**UCL and LCL**
% Passing #4 and larger sieves	Target ± 4.0
% Passing #8 and #16 sieves	Target ± 2.5
% Passing #30, #50, and #100 sieves	Target ± 1.5
% Passing #200 sieve	Target ± 1.0
PGAB Content	Target ± 0.25
VMA N_{des}	LCL = LSL + 0.2
Voids N_{des}	Target ± 1.2
G_{mm}	Target ± 0.015

The Contractor shall submit all QC test and inspection reports and updated control charts to the Resident by email. The reports and updated control charts shall be signed by the appropriate technician and be submitted to the Resident by 1:00 P.M. / A.M. on the next working day / night.

The Contractor shall submit a list of on-site laboratory and sampling facilities, including available equipment.

Adequate and convenient sampling facilities shall be provided, allowing the Resident and the Authority's designated quality assurance personnel to obtain representative samples from the full width and depth of the discharge area of each aggregate bin. The sampling tray shall be structurally supported during the sampling operation. Access to the sampling facilities shall be provided. The

use of such access shall not be more difficult than climbing a ladder leading to a secure platform with railings.

Final acceptance shall be based on quality assurance tests to assure compliance with the job mix formula as established. Samples and certified quality control reports shall be available to the Resident and the Authority's designated quality assurance personnel as often as requested. Sample locations will be random in compliance with ASTM D3665 or as directed by the Resident.

When plant inspection is maintained, the material will be considered acceptable for use when the specified tests from samples obtained at the production plant indicate conformance to the approved job mix formula.

Quality assurance testing services for bituminous concrete pavement shall be provided by the Authority. The Contractor shall provide adequate space and all lab equipment, materials and chemicals at the bituminous plant necessary to verify job mix formula (asphalt content (AASHTO T164 or T308) and gradations). Upon completion, the Contractor shall be responsible for the proper disposal of all materials and chemicals. This work will not be measured separately for payment, but shall be incidental to the various items of the Contract.

A. Inspection. The Resident, or his authorized representative, shall have access and use of the laboratory facilities at any time and access to all parts of the plant for:

1. Inspection of the condition and operations of the plant.

2. Confirmation of the adequacy of equipment in use.

3. Verification of the character and proportions of the mixture.

4. Determination of temperatures being maintained in the preparation of the mixtures.

5. Inspection of incidental related procedures.

6. Performing quality assurance testing.

B. Plant Testing Laboratory. The Contractor shall provide a plant testing laboratory for use by the Authority's quality assurance personnel for acceptance testing functions.

The plant laboratory shall be available at the following times for use by the Authority's quality assurance personnel:

1. During periods of pavement production;

2. During periods of sampling and testing; and,

3. Whenever materials subject to the provisions of these Specifications are being supplied or tested.

The Authority's quality assurance personnel will always have priority in use of the laboratory. The laboratory shall have sufficient equipment in order for both (Authority's and Contractor's) testing representatives to operate efficiently.

The plant testing laboratory shall have a floor space area of not less than 150 square feet, with a ceiling height of not less than 7-1/2 feet. The laboratory shall be weather tight, sufficiently heated in cold weather and air-conditioned in hot weather, to maintain temperatures for testing purposes of 70°F ± 5°F.

As a minimum the plant testing laboratory shall have:

1. Adequate artificial lighting.
2. Electrical outlets sufficient in number and capacity for operating the required testing equipment and drying samples.
3. Two fire extinguishers, Underwriter's Laboratory approved.
4. Work benches for testing, minimum 2-1/2 feet by 10 feet.
5. Desk with two chairs.
6. Sanitary facilities convenient to testing laboratory.
7. Exhaust fan to outside air, minimum 12 inch blade diameter.
8. Secure High Speed Internet Access
9. File cabinet with lock for Resident.
10. Sink with running water, attached drain board and drain.
11. Metal stand for holding washing sieves.
12. Mechanical shaker and appropriate sieves (listed in 639.06) meeting the requirements of ASTM E11.
13. Superpave gyratory compactor.
14. Oven, thermostatically controlled, inside minimum one cubic foot.
15. Two volumetric specific gravity flasks, 500 CC.
16. Other necessary hand tools required for sampling and testing.
17. Library containing Contract Specification, latest ASTM Volumes 4.03 and 4.04, AASHTO Materials Parts I and II.

18. Equipment for Maximum Theoretical Density meeting the requirements of AASHTO T209 and equipment for Bulk Spec. Gravity meeting the requirements of AASHTO T166.

19. Infra-red temperature measuring device for use at both plant and Project site.

20. Necessary equipment for PGAB Content testing.

21. Diamond blade saw for trimming pavement cores.

22. Two ovens.

23. All equipment (scales, Superpave gyratory compactor, etc.) to have current calibrations and certifications.

Approval of the plant and testing laboratory by the Resident requires all the above facilities and equipment to be in good working order during pavement production, sampling and testing. Failure to provide any of the above shall be sufficient cause for disapproving the bituminous plant operations.

401.21 Method of Measurement

The Authority will measure Hot Mix Asphalt Pavement by the ton in accordance with Subsection 108.1, Measurement of Quantities for Payment.

A reduction in payment will occur when the voids, asphalt content, gradation, and density are other than the limits specified below for 100 percent payment. The payment reduction for voids and PGAB content and density will be based upon each sublot (500 tons) of production as specified in Subsections 401.162, 401.163, 401.164, and 401.165. The Contractor may request one retest for each failing sublot for core density only. The original core density and the recut core density shall be averaged together to determine payment for the sublot. No retest will be allowed for voids or asphalt content. The Contractor shall pay $250.00 for each additional core tested. Pavement restoration will not be measured separately for payment but shall be incidental to the respective pay item.

Any lot resulting in zero payment shall be removed, disposed of and replaced at no additional cost to the Authority. Replacement pavement will be paid for based on the accepted and payment criteria specified herein.

CORE DENSITY VS. CORE THEORETICAL MAXIMUM DENSITY COMPACTION (SURFACE) 92.5-97 PERCENT	
PERCENT COMPACTION	**PERCENT PAYMENT**
92.5 - 97.0	100
91.5 - 92.4, 97.1 - 97.9	95
90.5 - 91.4, 98.0 - 98.5	85
90.0 - 90.4, 98.6 - 99.0	75
<90.0, > 99.0	0

Note: Percent compaction is the percentage of the field core density as compared to the Theoretical Maximum Density (TMD) of that core.

AIR VOIDS – 2.5 – 5.5 PERCENT	
VOIDS	**PAYMENT PERCENT**
2.5 to 5.5	100
2.0 - 2.4, 5.6 - 6.1	95
1.5 – 1.9, 6.2 – 6.6	85
1.0 - 1.4, 6.7-7.1	75
<1.0, >7.1	0
Note: Voids are based on the average of the test specimens fabricated at the plant for each sublot (500 tons).	

Payment for PGAB content shall be based on the JMF aim with an allowable production tolerance of 0.4% except that test results which fall outside of the following ranges shall not be permitted:

9.5 mm	5.7 – 7.5
12.5 mm	5.2 – 6.4

9.5 mm PGAB CONTENT	
% PGAB	**% PAYMENT**
JMF Aim ± 0.4	100
JMF Aim + 0.5 , - 0.5 , < 5.7	95
JMF Aim + 0.6 , - 0.6 , < 5.6	85
JMF Aim + 0.7 , - 0.7 , < 5.5	75
JMF Aim + 0.8 , - 0.8 , ≦ 5.4, > 7.5	50
Note: PGAB content is based on samples tested at the plant for each 500 Ton sublot	
12.5 mm PGAB CONTENT	
% PGAB	**% PAYMENT**
JMF Aim ± 0.4	100
JMF Aim + 0.5 , - 0.5 , < 5.1	95
JMF Aim + 0.6 , - 0.6 , < 5.0	85
JMF Aim + 0.7 , - 0.7 , < 4.9	75
JMF Aim + 0.8 , - 0.8 , ≦ 4.8, > 6.4	50
Note: PGAB content is based on samples tested at the plant for each 500 Ton sublot	
Gradation	
Sieve Size	**% Deduction**
% Passing #4 and larger sieves	N/A
% Passing #8 sieve	2
% Passing #16 sieve	N/A
% Passing #30 sieve	N/A
% Passing #50 sieve	1
% Passing #100 sieve	N/A
% Passing #200 sieve	3

Note: Gradation is based on samples tested at the plant for each 500 Ton sublot

As an example of payment reduction, if a sublot of 500 tons of 12.5mm was tested and found to have 96 percent TMD compaction, 5.8 percent air voids and asphalt content of 5.19 percent, the payment reduction would be as follows:

500 tons x 1.00	= 500 tons payment	=	0 tons reduction (compaction)
500 tons x 0.95	= 475 tons payment	=	25 tons reduction (voids)
500 tons x 0.95	= 475 tons payment	=	25 tons reduction (asphalt content)

Payment = 500 tons - (0 + 25 + 25) = 450 tons.

401.22 Basis of Payment

The Authority 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 Authority will pay for the work specified in Subsection 401.11, 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 specified material to joints, and providing testing facilities and equipment.

SPECIAL PROVISION

SECTION 403

HOT MIX ASPHALT PAVEMENT

Section 403 of the Maine Department of Transportation Standard Specifications 2020 Edition is deleted in its entirety and replaced with the following:

403.01 Description

This work shall also consist of the construction, maintenance and removal of all temporary bituminous ramps at locations as shown on the Plans or as directed by the Resident.

403.02 General

The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. The Performance Graded Asphalt Binder (PGAB) shall be polymer modified as detailed in this special provision and shall conform to the requirements of AASHTO M 332. The PG70E-28 Binder shall be modified using a Styrene-Butadiene-Styrene (SBS) polymer {BWT} in a homogeneous blend. The stability of the modified binder shall be verified in accordance with ATSM D7173 using the Dynamic Shear Rheometer (DSR). The DSR G*/sin(δ) results from the top and bottom sections of the ATSM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report.

403.03 Construction

All areas which have been milled or overlaid shall have a minimum length temporary ramp constructed as determined by the Resident at the milled or overlaid limits prior to opening the roadway to traffic. Temporary ramps shall be constructed using the same material as being placed on that day or as directed by the Resident. All temporary ramps are to be constructed on a sand joint. The Contractor shall be responsible for all repairs and maintenance required for the temporary ramps.

The Contractor shall be responsible for the layout of the longitudinal centerline between the travel lanes.

The sand and loose debris adjacent to the median guardrail shall be removed and disposed of by the Contractor off of Turnpike property.

The forty-five degree pavement safety edge needed between adjacent lanes and or shoulders shall be incidental to the 202 pay items.

403.04 Method of Measurement

Hot mix asphalt pavement will be measured as specified in Section 401.21.

403.05 Basis of Payment

Hot mix asphalt pavement will be measured as specified in Section 401.22.

The following pay items are added:

Pay Item		Pay Unit
403.207	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size	TON
403.208	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size	TON
403.2081	Hot Mix Asphalt, 12.5 mm (Polymer/Latex Modified)	TON
403.2082	Hot Mix Asphalt, 12.5 mm (Polymer/Latex Modified) - Overlay	TON
403.2083	Hot Mix Asphalt, 12.5 mm (Polymer/Latex Modified) - Mill &Fill, Ramps	TON
403.20831	Hot Mix Asphalt, 12.5 mm (Polymer/Latex Modified) - Mill & Fill	TON
403.2084	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (sidewalks, drives, islands & incidentals)	TON
403.2085	Hot Mix Asphalt, 12.5 mm (Polymer/Latex Modified) - Bridge Deck	TON
403.209	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (sidewalks, drives, islands & incidentals)	TON
403.21	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size	TON
403.2101	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size -Bridge Deck	TON
403.21041	Hot Mix Asphalt, 9.5 mm (Polymer/Latex Modified) - Mill & Fill	TON
403.21042	Hot Mix Asphalt, 9.5 mm (Polymer/Latex Modified) - Bridge Deck	TON
403.21043	Hot Mix Asphalt, 9.5 mm (Polymer/Latex Modified) - Overlay	TON
403.21044	Hot Mix Asphalt, 9.5 mm (Polymer/Latex Modified) -Interchange	TON
403.211	Hot Mix Asphalt, Shimming	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

SPECIAL PROVISION

SECTION 403

HOT MIX ASPHALT PAVEMENT

Course	HMA Grading	Item Number	Total Thickness	No. of Layers	Complimentary Notes
Service Plaza- Full Depth Construction					
Surface	**12.5 mm**	**403.208**	**1.5”**	**1**	**A,C,I**
Intermediate	**12.5 mm**	**403.213**	**1.5”**	**1**	**A,C,I**
Base	**19.0 mm**	**403.207**	**2.5”**	**1**	**A,C,I**
Service Plaza- Temporary Walkway					
Surface	**9.5 mm**	**403.209**	**2”**	**2**	**A,C**

COMPLEMENTARY NOTES

A. The required PGAB for this mixture shall be **64-28.**
B. RAP may not be used.
C. The Maine DOT will conduct the job mix verification. The aggregate qualities shall meet the design traffic level of 3 to <10 million ESALS for mix placed under this contract. Minimum and Maximum PGAB content limits from 401.21 shall not apply.
D. The MTA will conduct the job mix verification. The aggregate qualities shall meet the design traffic level of 10 to <30 million ESALS for mix placed under this contract. The design verification, Quality Control, and Acceptance tests for this mix will be performed at **75 gyrations**. (N design)
E. A material transfer vehicle (MTV) shall be used for the placement of Hot Mix Asphalt wearing surface on all roadways including acceleration and deceleration lanes and all ramps.
F. Joints shall be constructed as the “notched wedge” type in accordance with Subsection 401.17.
G. Joint density will be measured in accordance with Subsection 401.165.
H. PGAB shall conform to the provisions of 403.02 – Polymer Modified PGAB for HMA
I. The contractor shall furnish a quality control technician equipped with an approved densometer to ensure density requirements are met.
J. Hydrated Lime shall be incorporated into the mixture.
K. The antistrip additive Zycotherm SP manufactured by Zydex Industries shall be incorporated into the PGAB at a rate of 0.125%.

SPECIAL PROVISION

SECTION 409

BITUMINOUS TACK COAT

409.01 Description

This Subsection is deleted and replaced with the following:

This work consists of furnishing and applying one uniform application of Emulsified Asphalt RS-1 or RS-1h conforming to the specifications of AASHTO M-140. The application rate shall be 0.04 gal/yd^2

This work consists of furnishing and applying one uniform application of UltraTack (NTSS-1HM) by Blacklidge or an approved equal as indicated in this specification and as per manufacturers' recommendation. The application rate shall be 0.06 gal/yd^2

409.05 Equipment

Add "or as determined by the Resident", after the words "gal/yd^2]" in the fourth line of the second paragraph of this Subsection.

409.06 Preparation of Surface

The following paragraph is added:

All existing pavement and shoulder areas on which bituminous concrete mixtures are to be placed shall receive a tack coat. The surface area where the tack coat is to be applied shall be dry and cleaned of all dirt, sand, and loose material. Cleaning shall be accomplished by use of revolving brooms or mechanical sweepers. Undesirable material not removed by the above means shall be cleaned by hand sweeping or scraping, or a combination of both. Small areas otherwise inaccessible may be swept with hand brooms. The tack coat shall be applied only when the existing surface is dry.

409.08 Method of Measurement

The following paragraphs are added:

Measurement will be based on delivery slips made out in duplicate by the Contractor and signed by the Resident, or his representative, at the point of delivery. One of these slips shall be retained by the Resident and one by the Contractor. Delivery slips shall be furnished by the Contractor and shall provide space for identifying the vehicle and driver, for stating the volume of material carried, the source of the material, the date, and the Resident or his representative's signature.

Material included in the delivery slips and not used or rejected shall be deducted from the amount being measured for payment. Each day's delivery slips shall be reconciled by the Contractor and the Resident within 24-hours.

Cleaning of the surface area where tack coat is to be applied shall be incidental to Item 409.152, Bituminous Tack Coat - Applied.

409.09 Basis of Payment

The following pay items are added:

Pay Item		Pay Unit
409.15	Bituminous Tack Coat RS-1 or RS1h– Applied	Gallon
409.152	Bituminous Tack Coat NTSS-1HM Trackless– Applied	Gallon

SPECIAL PROVISION

SECTION 419

SAWING AND SEALING JOINTS IN BITUMINOUS PAVEMENT

(Sawing Bituminous Pavement)

419.01 Description

This work consists of sawing bituminous concrete pavement as shown on the Plans, as specified herein or as approved by the Resident.

419.02 General

The bituminous concrete pavement to be sawed shall be accurately marked before cutting. The marking shall be in accordance with the locations as shown on the Plans or as approved by the Resident. Cutting shall be with an approved power driven saw with an abrasive blade.

Unless otherwise noted or directed, the sawcut shall be vertical, a minimum of 3/8 inch wide, and extend to the depth as shown on the Plans.

Residue or debris from the sawing operation shall be removed immediately and legally disposed of by the Contractor.

419.03 Method of Measurement

Sawing Bituminous Pavement will be measured by the linear foot of pavement actually cut and accepted. No additional payment will be made for variations in the pavement thickness.

419.04 Basis of Payment

Sawing Bituminous Pavement will be paid for at the Contract unit price per linear foot which shall be full compensation for all materials, tools, equipment labor, and all incidentals necessary for the completion of the work to the satisfaction of the Resident. The disposal of sawcut residue shall be incidental to this item.

Payment will be made under:

Pay Item		Pay Unit
419.30	Sawing Bituminous Pavement	Linear Foot

SPECIAL PROVISION

SECTION 502

STRUCTURAL CONCRETE

(Concrete Gas Island and Slab)
(Concrete Diesel Island and Slab)
(Concrete Fuel Tank Slab)

502.01 Description

The following paragraph is added:

This work shall consist of furnishing and placing Portland Cement Concrete for the fuel system islands and slabs, and fuel tank slabs in accordance with these Specifications and in conformity with the lines, grades, and dimensions shown on the Plans.

All exposed surfaces shall be coated with a clear penetrating sealer meeting the requirements of Section 515.

502.18 Method of Measurement

The following sentences are added:

Concrete for Concrete Gas Island and Slab satisfactorily placed and accepted will be measured by the cubic yard, in accordance with the dimensions shown on the Plans or authorized changes in the Plans.

Concrete for Concrete Diesel Island and Slab satisfactorily placed and accepted will be measured by the cubic yard, in accordance with the dimensions shown on the Plans or authorized changes in the Plans.

Concrete for Concrete Fuel Tank Slab satisfactorily placed and accepted will be measured by the cubic yard, in accordance with the dimensions shown on the Plans or authorized changes in the Plans.

502.19 Basis of Payment

The following paragraphs are added:

The accepted work completed for Concrete Gas Island and Slab will be paid for at the Contract unit price per cubic yard. Payment shall be full compensation for furnishing all materials, expansion joint filler, bonding, curing, and joint sealing and all incidentals necessary to complete the work.

The accepted work completed for Concrete for Concrete Diesel Island and Slab will be paid for at the Contract unit price per cubic yard. Payment shall be full compensation for furnishing all

materials, expansion joint filler, bonding, curing, and joint sealing and all incidentals necessary to complete the work.

The accepted work done for Concrete Fuel Tank Slab will be paid for at the Contract unit price per cubic yard. Payment shall be full compensation for furnishing all materials, expansion joint filler, bonding, curing, and joint sealing, protective coating and all incidentals necessary to complete the work.

Reinforcing steel will be paid for separately in accordance with Section 503, Reinforcing Steel.

Protective coating will not be measured for payment but will be incidental to Concrete Slab items.

All costs associated with obtaining, testing and evaluating drilled specimens for dispute resolution will not be paid for separately, but shall be considered incidental to the related items.

Payment will be made under:

Pay Item		Pay Unit
502.701	Concrete Gas Island and Slab	Cubic Yard
502.702	Concrete Diesel Island and Slab	Cubic Yard
502.703	Concrete Fuel Tank Slab	Cubic Yard

SPECIAL PROVISION

SECTION 515

PROTECTIVE COATING FOR CONCRETE SURFACES

(Clear Concrete Protective Coating)

Section 515, Protective Coating for Concrete Surfaces, is deleted in its entirety and replaced with the following:

515.01 Description

The work shall include the surface preparation and application of a clear protective coating on concrete surfaces to protect new cast-in-place concrete, precast concrete and masonry structures. The coating system shall be applied to transition barriers, curbs and fascia in accordance with the Plans, Specifications and the manufacturer's published recommendations.

515.02 Materials

The penetrating sealer shall be:

Certi-Vex Penseal 244-100%

Type	1c Penetrating Silane
Min. Appl.Temp. (F)	20-90
Silanes (%)	100% silane, alcohol based
VOCs (g/L)	< 250

Sikagard 705 L

Type	1c Penetrating Silane
Min. Appl.Temp. (F)	40-95
Silanes (%)	100% silane, alcohol based
VOCs (g/L)	100

SIL-ACT ATS-100 LV Silane

Type	1c Penetrating Silane
Min. Appl.Temp. (F)	40-110
Silanes (%)	100% silane, alcohol based
VOCs (g/L)	< 250

SIL-ACT ATS-300

Type	1c Penetrating Silane
Min. Appl.Temp. (F)	20-110
Silanes (%)	100% silane, solvent based
VOCs (g/L)	242

The product shall comply with regulations limiting the Volatile Organic Compound (VOC) content of architectural and industrial maintenance coatings.

The Contractor shall submit the product's data sheets, material safety data sheets and recommended instructions for application.

Materials shall be delivered to the site in original packages or containers bearing the manufacturer's labels and identification.

515.21 Substitute Materials

The Contractor shall submit a written request for approval of proposed substitute material naming the proposed manufacturer and product. This request shall be accompanied by:

1. Test data from an independent testing laboratory stating that the proposed substitute meets or exceeds the specified requirements as listed and has been tested in accordance with the specified test standards.

2. Documentation that the proposed material has a proven record of performance when used in the intended application as confirmed by actual field tests and successful installations in place on at least five similar projects.

3. Certification that if two or more types of products are intended to be used as part of a system, they will be supplied by the same manufacturer to ensure compatibility of materials, and to maintain single source manufacturer responsibility.

The Resident reserves the right to require additional testing to evaluate any proposed substitute product at no additional cost to the Authority. The Resident's decision as to the acceptability or non-acceptability of the proposed product shall be final.

515.03 Surface Preparation

All caulking, patching, and joint sealant shall be installed prior to application of the sealer. On new surfaces to be treated, all voids shall be dressed by dry rubbing to remove form marks and blemishes to present a neat appearance. Concrete and masonry surfaces shall be cleaned free of dust, surface dirt, oil, efflorescence and contaminants to ensure penetration of the sealer. The surface may be slightly damp at the time of treatment.

The Contractor may use, when required, appropriate cleaning materials recommended by the sealer manufacturer in conjunction with high pressure water for cleaning the concrete or masonry.

515.04 Application

The Contractor shall apply the clear concrete protective coating in strict accordance with the manufacturer's published recommendations.

The work shall not be conducted when there is a chance of the surface temperature falling below minimum allowable temperature in the 24-hours following application; nor should it be applied on hot, windy days.

The treatment shall not be applied during rain to wet surfaces. It shall not be applied when winds are sufficient to carry airborne chemicals. Product shall be cured per the manufactures recommendations.

Prior to applying the sealer, the Contractor shall protect all surrounding non-masonry/non-concrete surfaces, landscape and lawn areas, and surfaces not designated for treatment, from contact with the penetrating sealer, and prevent overspray of the penetrating sealer caused by wind drift.

The Contractor shall ensure that all safety equipment, facilities and precautions recommended by the product manufacturer are furnished and/or strictly adhered to.

The sealer material shall be applied in the manner and with the equipment recommended by the product manufacturer. Coverage will vary depending on condition, texture and porosity of the surfaces. Pre-testing is required to determine acceptability of the procedure.

Sealer shall be applied as packaged without dilution or alteration. Sufficient material shall be applied to thoroughly saturate the surface making sure to brush out excess material that does not penetrate.

When the sealer is applied to horizontal surfaces, it shall be applied in a single saturating application with sufficient material and applied so the surface remains wet for one to two minutes before penetration into the concrete. Surface residues, pools and puddles shall be broomed-out thoroughly until they completely penetrate into the surface.

When the sealer is applied to vertical and sloped surfaces, it shall be applied in a "wet-on-wet" application for best results on most porous materials. In the case of extremely dense concrete, it may be necessary to restrict the amount of material applied to one saturating application in order to prevent surface darkening.

515.05 Method of Measurement

Clear Protective Coating for Concrete Surfaces will be measured for payment by the square yard, satisfactorily applied and accepted.

515.06 Basis of Payment

Clear Protective Coating for Concrete Surfaces will be paid at the Contract unit price per square yard which price shall be full compensation for all labor, materials, equipment and incidentals required for furnishing and applying the clear concrete protective coating as shown on the Plans, in accordance with these Specifications or as approved by the Resident.

Surface preparation, vegetation removal, and protection of surfaces not designated for treatment will not be measured separately for payment, but shall be incidental to the Clear Concrete Protective Coating item.

Payment will be made under:

Pay Item	Pay Unit	
515.202	Clear Protective Coating for Concrete Surfaces	Square Yard

SPECIAL PROVISION

SECTION 526

CONCRETE BARRIER

(Temporary Barrier Markers)

526.1 Description

The following paragraphs are added:

This work shall consist of furnishing, installing and maintaining temporary barrier markers on all temporary barrier supplied by the Contractor and the Authority.

526.2 Materials

The following paragraphs are added:

Temporary barrier markers shall be "Big Dog" barrier markers manufactured by Custom Products Corporation, or approved equal. Markers shall be bi-directional with a minimum effective reflective area of 96 square inches (48 square inches each side) as approved by the Resident. The reflectors shall meet MUTCD reflectivity requirements and shall be orange in color.

526.3 Construction Requirements

The following paragraphs are added:

Temporary barrier markers shall be mounted as follows:

1. One on every fourth barrier in tangents and one on every two barriers in tapers, including all barrier furnished by the Contractor.

2. Delineators shall be physically adhered so as to withstand the force of throw from a snow plow.

3. If more than 25% of delineators in any 50 foot section of barrier fall off for any reason, the Contractor will be responsible for reinstalling all the delineators in that run at that their own cost.

4. Contractor is required to submit the installation method for review and approval to the Resident.

526.4 Method of Measurement

The following paragraphs are added:

Temporary barrier markers shall not be measured for payment separately but shall be incidental to the temporary barrier item.

526.5 Basis of Payment

The following paragraphs are added:

Temporary barrier markers shall not be paid for separately but shall be incidental to the temporary barrier item.

SPECIAL PROVISION

SECTION 526

CONCRETE BARRIER

(Temporary Concrete Barrier Type I - Supplied by Authority)

526.01 Description

The following paragraphs are added:

This work shall consist of loading, transporting, setting, resetting, removing, transporting and stacking Temporary Concrete Barrier Type I – Supplied by Authority. The barrier shall have attachments allowing individual sections to be connected into a continuous barrier.

The work also includes supplying connecting pins and furnishing and mounting retro-reflective delineators, per Subsection 526.02 and 526.03.

Concrete barriers supplied by Authority shall be available at the following location(s):

Maintenance Area	Linear Feet of Barrier
Crosby Maintenance Area	800 LF

Upon substantial completion of work, the Contractor shall remove and transport the barrier back to its maintenance area of origin. All barrier shall be returned, sorted and stacked according to type in locations directed by the project Resident or maintenance area foreman.

526.02 Materials

The following paragraphs are added:

e. Delineators shall be bi-directional with a minimum effective reflective area of eight square inches as approved by the Resident. The reflectors shall be methyl methacrylate and the housing of acrylonitrile butadiene styrene. Color shall be in accordance with the MUTCD.

526.021 Acceptance

The Resident shall have the authority to accept or reject all Temporary Concrete Barrier Type I – Supplied by Authority used on the Project that does not meet the requirements of this specification

526.03 Construction Requirements

The following paragraphs are added:

The Contractor shall notify the Resident prior to the scheduled pick-up and delivery of concrete barrier. No barrier shall be removed from or stacked at the Turnpike Maintenance Area without approval of the Resident.

The Contractor shall move and place barrier-utilizing methods that will not damage the barrier. Barrier that is damaged by the Contractor by failing to use proper methods shall be replaced by the Contractor at no additional cost to the Maine Turnpike Authority.

Concrete barrier supplied by the Authority consists of several different styles. Not all barriers may be compatible. The Contractor shall utilize caution when setting barrier to use identical barrier types as adjacent barrier. Non-compatible barrier that cannot be attached together shall be overlapped by a minimum of 10 feet with the blunt end on the non-traffic side of the barrier. This work will not be measured separately for payment, but shall be incidental to the concrete barrier.

Concrete barrier placed at roadway low points shall be shimmed on 1" by 2" by 2' long wood planks to allow drainage to pass under the barrier. In addition, the Resident may direct the Contractor to shim the concrete barrier at other locations to provide for proper roadway drainage. All labor, material, and equipment necessary to shim the barrier will not be measured separately for payment, but shall be incidental to the Concrete Barrier.

The removal of concrete barrier from adjacent to the travel lane may be conducted without a lane closure if it is accomplished in accordance with the following requirements:

1. Barrier is removed from the trailing end and the workmen and equipment involved in the operation are always behind the barrier. No workmen or equipment shall enter the travel lane.
2. Barrier shall be dragged away from the travel lane to at least a 30-degree angle by the use of a cable.
3. Barrier shall be lifted no more than six inches while within 10 feet of the travel lane.

Retro-Reflective Delineators shall be mounted as follows:

4. One on top of each barrier.
5. One on the traffic side of every barrier used in a taper.
6. One on the traffic side of every other barrier at regularly spaced intervals and locations.
7. Delineators shall be installed on both sides of the barrier if barrier is used to separate opposing traffic.
8. Delineators shall be physically adhered so as to withstand the force of throw from a snow plow.
9. If more than 25% of delineators in any 50 foot section of barrier fall off for any reason, the Contractor will be responsible for reinstalling all the delineators in that run at that their own cost.
10. Contractor is required to submit the installation method for review and approval to the Resident.

526.04 Method of Measurement

The following paragraphs are added:

Temporary Concrete Barrier Type I – Supplied by Authority shall be measured for payment by the lump sum.

The loading, transporting, setting, resetting, removing, transporting, sorting and stacking of the barrier, the furnishing, installation and maintenance of the barrier delineators, and furnishing and installing connector pins will not be measured separately for payment, but shall be incidental to the cost of the Barrier. Temporary storage of Concrete Barrier between construction phases, if required, will not be measured separately for payment, but shall be incidental to the cost of the Barrier. All equipment required to load, unload, transport and stack Concrete Barrier shall be supplied by the Contractor.

Any Barrier lost or damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Authority.

526.05 Basis of Payment

The fifth paragraph is deleted and not replaced.

The following paragraphs are added:

Temporary Concrete Barrier Type I – Supplied by Authority will be paid for at the Contract lump sum price, complete in place. Such payment shall be full compensation for loading, transporting, setting, resetting, temporary storage, removing, transporting and stacking at the area designated, furnishing all materials, and all other incidentals necessary to complete the work. Temporary Concrete Barrier Type I – Supplied by Authority and all connecting pins shall remain the property of the Authority, and shall be returned to the Turnpike Maintenance Area as designated in Subsection 526.01.

Payment of Concrete Barrier shall be based on a percentage of the work accomplished during that pay period.

Payment will be made under:

Pay Item		Pay Unit
526.306	Temporary Concrete Barrier, Type I – Supplied by Authority	Lump Sum

SPECIAL PROVISION

SECTION 603

PIPE CULVERTS AND STORM DRAINS

(Reinforced Concrete Pipe)
(Concrete Collar)
(Corrugated Polyethylene Pipe)

603.01 Description

The following paragraphs are added:

This work shall also consist of furnishing and installing Class III or Class V reinforced concrete pipe at the locations as shown on the Plans or as approved by the Resident.

This work also consists of furnishing and installing a concrete collar to join existing concrete pipe to the proposed concrete or Corrugated High Density Polyethylene (HDPE) pipe in accordance with the details as shown on the Plans. The Contractor shall note that the concrete pipe ends may be of different sizes and may not fit snugly together.

This work shall also consist of furnishing and installing various sizes of corrugated HDPE pipe, including a dual wall adaptor fitting by Hancor or an approved equal as shown on the plans. No other pipe types within the Option III alternatives will be accepted.

603.02 Materials

All Corrugated High Density Polyethylene (HDPE) pipe for storm water and drainage systems shall meet the requirements of Subsection 706.06.

603.11 Method of Measurement

The following paragraph is added:

The Concrete Collar shall be measured by each unit installed, complete in place and accepted. This shall be full compensation for furnishing labor and materials to construct a Concrete Collar to connect the existing and proposed pipe ends in a working like manner.

Dual Wall Adapter Fitting shall be included for payment as three additional linear feet of the largest pipe involved.

603.12 Basis of Payment

Concrete Collars will be paid for at the Contract unit price each regardless of the size of the existing and proposed pipes.

Corrugated HDPE pipe will be paid for under the appropriate sized Culvert Pipe Option III pay items

Payment will be made under:

Pay Item		Pay Unit
603.155	12 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.165	15 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.1653	15 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.175	18 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.1753	18 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.195	24 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.1953	24 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.205	30 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2053	30 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.215	36 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2153	36 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.225	42 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2253	42 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.235	48 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2353	48 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.245	54 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2453	54 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.255	60 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2553	60 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.265	66 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2653	66 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.275	72 inch Reinforced Concrete Pipe - Class III	Linear Foot
603.2753	72 inch Reinforced Concrete Pipe - Class V	Linear Foot
603.155	12 Inch Reinforced Concrete Pipe – Class III	Linear Foot
603.28	Concrete Collar	Each

SPECIAL PROVISION

SECTION 604

MANHOLES, INLETS, AND CATCH BASINS

(Oil-Water Separator System)

604.01 Description

This work shall include furnishing and installing an oil-water separator system. The oil-water separator system shall consist of a precast oil-water separator structure, including a swirl chamber, baffles, manways and covers for access and maintenance, design and shop drawing submittal(s). The system shown on the plans is for informational purposes only. The manhole used to connect to the upstream drainage system shall include a baffle to allow bypass of high flow volumes and the baffle installation will be paid for under Item 604.09.

The work shall also include design of the proposed drainage system to include connections to the proposed drainage system as required, all testing and all other work necessary to complete the construction, all in accordance with these Specifications and as shown on the Plans or as directed by the Resident.

604.02 Materials

The following sentences are added:

Elastomeric sealer shall be Sikaflex 1a as manufactured by Sika or an approved equal.

Class AAA concrete shall conform to Subsection 502.05; except that the minimum cement factor shall be 750 pounds per cubic yard and the coarse aggregate size shall conform to ASTM C33 Grading 7.

The third paragraph should be deleted and replaced with:

Catch Basin Frames and Grates shall be as outlined below and be manufactured by EJ Company of Brockton, Massachusetts or an approved equal and shall meet or exceed the AASHTO M306 Loading Requirements.

Catch Basin Frames shall be manufactured by EJ Company of Brockton, Massachusetts (or an approved equal) with the following product numbers:

5521Z - 8 Inch Frame Product Number 00552111
5546Z – 6 Inch Frame Product Number 00554611
5544Z - 4 Inch Frame Product Number 00554411

Catch Basin Frames shall be 8” frames unless otherwise specified by the plans or approved by the resident.

Catch Basin Grates shall be a square holed grate as manufactured by EJ Company of Brockton, Massachusetts (or an approved equal) with the following product number:

5520M5 Grate Product Number 00552060

If a cascade catch basin grate is specified on the plans then it shall be manufactured by EJ Company of Brockton, Massachusetts (or an approved equal) with the following product numbers depending on the direction of flow:

5520M8 Product Number 00552084 or 5520M8 Product Number 00552085

604.05 Method of Measurement

The following sentence is added:

Oil-Water Separator System will be measured by the number of units, complete and accepted in place.

604.06 Basis of Payment

The following paragraphs are added:

The accepted quantity of Oil-Water Separator System will be paid for at the contract unit price each complete and place. Payment shall include the design, detailing, fabrication, delivery and installation as well as excavation, dewatering, shoring, bracing, sheeting, bedding, backfill, compaction, precast concrete manholes, steps, casting frames and covers, brick masonry, concrete, concrete adjustment collars, mortar, dampproofing, all piping and piping support systems and hardware within the structure, flexible watertight pipe connectors, testing, and all material, labor and tools incidental to the work which is required to construct a complete functional system.

Payment shall be full compensation for furnishing and installing and all incidental materials and equipment necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
604.30	Oil-Water Separator System	Each

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Guardrail – Remove, Modify and Reset, Single Rail)
(Guardrail – Remove, Modify and Reset, Double Rail)
(Guardrail - Remove and Stack)
(Guardrail Adjust – Single Rail)
(Guardrail Adjust – Double Rail)

606.01 Description

The following paragraphs are added:

This work shall also consist of adjusting the height of the existing single and double rail guardrail in locations where the existing height of rail is not 30 inches. The guardrail shall be adjusted to a height of 30 inches. Existing single and double rail shall also be adjusted for lean.

The guardrail adjustment shall take place at all necessary locations; approximate locations are listed in the schedule of guardrail limits both median and outside shoulder. Exact locations for adjustment shall be determined by the Resident. If, during the course of the work, the contractor finds additional rail to be adjusted, then he shall notify the Resident, and the Resident determine if the rail is to be adjusted.

This work shall also consist of removing, stockpiling and stacking of existing single and double guardrail elements, component parts and hardware suitable for replacement as approved by the Resident. At the completion of the Contract, any unused guardrail elements, posts, component parts and hardware suitable for reuse shall remain the property of the Authority. Any guardrail elements, posts, component parts and hardware unsuitable for reuse shall become property of the Contractor.

Stockpiled materials, suitable for reuse, shall be utilized on Remove, Modify and Reset items prior to new materials being paid for.

This work shall consist of removing, disposing of existing guardrail elements, component parts and hardware, as directed by the Resident. All materials shall become the property of the Contractor and shall be removed from the site at the completion of the Project. The Contractor shall provide the Resident with an affidavit stating the final location of all disposed material and that the material was disposed of in accordance with the Maine Department of Environmental Protection Solid Waste Regulations.

606.02 Materials

The following paragraph is added at the end of the subsection:

New non-wood offset blocks conforming to NCHRP 350 Test Level 3 shall be installed on all guardrail being reset. The existing steel offset brackets and backup plates shall become the property of the contractor.

The following Subsection is added:

606.021 General

All existing guardrail to be raised or lowered shall be completed prior to new guardrail or end treatments being attached.

606.036 Adjusting Existing Guardrail

Any materials or galvanizing damaged by the Contractor's operations shall be replaced or touched-up at no additional cost to the Authority.

Guardrail posts shall be raised to a minimum of five inches above final elevation prior to driving post to final elevation; this applies to both raising and lowering rail.

Any given length of guardrail to be adjusted shall be done in such a way that top of rail elevations do not vary drastically between each section of guardrail. Rail height tolerance shall be 30 inches, plus 0 inches, minus 1/2 inch. The 30 inches shall be measured from the edge of pavement to the top of rail beam when within 2 feet of the edge of pavement.

Rail shall be adjusted for lean where needed. All posts shall be plumb after adjusting for lean.

When the rail tapers from one bound to the other the rail shall be adjusted to the correct height on the farthest ends and shall be adjusted towards the center of the median to create a smooth line.

Earth around each adjusted or reset post shall be raked and compacted with a minimum 8 pound hand tamper or an approved device. Holes created due to adjusting or resetting a post shall be filled with a similar surrounding material and compacted.

606.08 Method of Measurement

The following paragraphs are added:

Adjusting of both single and double rail guardrail shall be measured by the linear foot of Guardrail adjusted and accepted.

Raking and compacting the earth around each reset post with a minimum 8 pound hand tamper or an approved device, and infilling and compacting holes created due to resetting posts with a similar surrounding material will not be paid separately, but shall be incidental to the Guardrail - Remove, Modify and Reset Pay or Guardrail - Adjust pay items.

Guardrail Remove and Stack will be measured on a linear foot basis of guardrail satisfactorily removed and stockpiled whether single rail or double rail. Single and double twisted end sections will be measured for payment on a linear foot basis as 25 feet of guardrail removed.

Guardrail removed and not reset or stacked shall be incidental to Contract Items and include all removal, disposal, equipment and labor necessary to satisfactorily complete the work.

Steel posts to replace damaged posts shall come from the stockpile of guardrail components to be disposed of, from this Contract and will not be measured separately for payment. If, in the opinion of the Resident, there are no suitable steel posts in the stockpile then steel posts will be measured for payment.

W-beam rail elements to replace damaged rail elements shall come from the stockpile of guardrail from the Remove and Stack or the guardrail to be disposed of from this Contract and will not be measured separately for payment. If, in the opinion of the Resident, there are no suitable W-beam rail elements in the stockpile then the W-beam rail elements will be measured for payment.

606.09 Basis of Payment

The following paragraphs are added:

Adjusting of single and double rail guardrail will be paid for at the Contract unit price per linear foot and shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work. Guardrail Adjust will not be measured for payment until all compaction has been completed.

The accepted quantity of guardrail removal will be paid for at the Contract unit price bid, which price shall be full compensation for removing, transporting and stacking all guardrail elements, component parts and hardware, equipment, labor and all incidentals necessary to complete the work. No additional payment will be made for double rail.

Payment will be made under:

Pay Item		Pay Unit
606.3605	Guardrail – Remove, Modify, and Reset Single Rail	Linear Foot
606.3606	Guardrail – Remove, Modify, and Reset Double Rail	Linear Foot
606.369	Guardrail - Remove and Stack	Linear Foot
606.3621	Guardrail Adjust, Single Rail	Linear Foot
606.3622	Guardrail Adjust, Double Rail	Linear Foot

SPECIAL PROVISION

SECTION 606

GUARDRAIL

(Single Offset Block – W-Beam)
Single Offset Block - Thrie-Beam)
(Asymmetrical Thrie Beam Transition)

606.01 Description

The following paragraph is added:

This work shall consist of furnishing and installing single offset blocks at all existing guardrail beam locations that are not part of a new or remove, modify and reset location and as shown on the Contract Documents. New NCHRP 350 compliant offset block shall be installed on existing galvanized steel posts and connected to Guardrail Type 3d and Thrie Beam Rail.

This work shall consist of removing and stacking existing Thrie Beam Transition panels, furnishing and installing the Asymmetrical Thrie beam to W-beam Transition panels, single rail - modified section and double rail modified section, connecting it to the existing or proposed W-Beam guardrail and Thrie Beam modified at locations on the Maine Turnpike, as shown on the Plans or as approved by the Resident. All guardrail components shall have passed the NCHRP 350 Test Level 3. Composite offset blocks shall be used.

606.02 Materials

The following sentences are added:

Offset blocks shall have passed NCHRP 350 Test Level 3 and shall not be wood.

The following Subsection is added:

606.021 General

The existing median guardrail posts have four off-center bolt holes used to attach the existing steel offset blocks. The new offset blocks have two bolt holes centered on the W-beam section. The existing posts must be retrofitted to receive the new non-wood offset block assembly. Additional bolt holes required in the existing posts shall be drilled or punched but the size shall not exceed the dimension given by the manufacturer. Metal around the holes shall be cleaned and painted with a cold-applied zinc-rich paint. The holes shall not be burned with a torch.

The completed guardrail system shall be in conformance with the NCHRP 350 Test Level 3 requirements.

606.08 Method of Measurement

The following paragraphs are added:

Single Offset Block - W-Beam and Single Offset Block - Thrie Beam shall be measured per each unit installed and accepted.

Asymmetrical Thrie Beam Transition shall be measured by each unit installed and accepted.

606.09 Basis of Payment

The following paragraphs are added:

New Single Offset Block - W-Beam and Single Offset Block - Thrie Beam furnished and installed at specified locations will be paid for at the Contract unit price each complete in place and accepted. Payment shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work including, but not necessarily limited to, removal of existing rail beam, removal and disposal of existing offset block, drilling new holes in existing post, application of galvanized paint, furnishing and installing new non-wood offset block, removal and disposal of back-up plates, and resetting the rail beam.

Asymmetrical Thrie Beam Transition will be paid for at the Contract unit price each complete in place, and shall be full compensation for furnishing all labor, equipment and materials necessary to complete the work consisting of, but not necessarily limited to, furnishing and installing the Asymmetrical Thrie Beam to Existing W-beam Transition, Single Rail - Modified Section and Existing Double Rail – Modified Section, and all detailed accessories; furnishing and installing all required posts, composite offset blocks, cables, nuts, bolts, washers, and all other items necessary to complete the installation and connection to the existing or proposed W-Beam and the Thrie Beam – Modified.

Payment will be made under:

Pay Item		Pay Unit
606.471	Single Offset Block – W-Beam	Each
606.472	Single Offset Block – Thrie Beam	Each
606.701	Asymmetrical Thrie Beam Transition	Each

SPECIAL PROVISION

SECTION 607

FENCES

(6 Foot Chain Link Safety Fence)

607.01 Description

The following paragraph is added:

The work shall consist of the construction of a free standing six foot chain link safety fence, in accordance with these Specifications and in reasonably close conformity with the lines and grades shown on the Plans or established the Resident. The construction of the safety fence shall include furnishing, erection, maintaining, removing and resetting, and removal of the fence from the jobsite at the completion of the Project as directed by the Resident.

607.02 Materials

The following sentence is added:

The fence shall be a free standing six foot chain link fence by National Construction Rentals (Telephone number 1-800-352-5675), or an approved equal.

Contractor will submit drawings showing major components of the fencing and methods of support for approval.

607.07 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
607.18	6 Foot Chain Link Safety Fence	Linear Foot

SPECIAL PROVISION

SECTION 613

EROSION CONTROL BLANKET

613.01 Description

This work shall also include seeding, mulching and watering the median swale and/or longitudinal flow line to the limits and width as shown on the Plans or as directed by the Resident.

613.02 Materials

The following sentences are added:

Seeding shall meet the requirements of Section 618, Seeding, Method Number 2.

Mulch shall meet the requirements of Section 619.

The following Subsection is added:

613.041 Maintenance and Acceptance

See Section 618.10 for maintenance and acceptance of seeding.

613.042 Mulch

All mulch shall be placed after the area has been seeded and prior to the installation of the Erosion Control Blanket.

613.09 Basis of Payment

The following "and mulch" is added after the words "initial seeding" in the second sentence.

SPECIAL PROVISION

SECTION 619

MULCH

(Mulch – Plan Quantity)
(Temporary Mulch)

619.01 Description

The first paragraph is modified by the addition of the following:

"as a temporary or permanent erosion control measure" after the word "mulch".

Add the following sentence at the end of the first paragraph:

Refer to Section 656 Temporary Soil and Water Pollution Control, for more information on Temporary Mulch.

619.03 General

The first paragraph is deleted and replaced with the following:

Cellulose fiber mulch shall not be used within 200 feet of a wetland or stream. The limits shall be 200 feet up station and down station of the wetland or streams as well as the slopes adjacent to the stream. The application of hay or straw mulch with an approved binder shall be used at these locations to prevent erosion.

The use of cellulose fiber mulch will only be allowed at other areas with the approval of the Resident. The Contractor may be required to demonstrate that the material may be applied in a manner that will prevent erosion and will aid in the establishment of permanent vegetation. The Resident reserves the right to require the use of hay or straw mulch at all locations if he determines that the cellulose mulch is ineffective. Cellulose fiber mulch is not acceptable for winter stabilization.

610.06 Method of Measurement

The following sentence is added:

Temporary Mulch will be paid for by the lump sum.

656.10 Basis of Payment

Temporary Mulch will be paid for at the Contract price per lump sum which shall be full compensation for furnishing and spreading the Temporary Mulch as many times as necessary as determined by the Contractor's operations and staging. The price shall also include the additional mulch netting and snow removal necessary during the winter months.

Payment will be made under:

Pay Item		Pay Unit
619.1201	Mulch – Plan Quantity	Unit
619.1202	Temporary Mulch	Lump Sum

SPECIAL PROVISION

SECTION 627

PAVEMENT MARKINGS

(Temporary 6 Inch Pavement Marking Tape)
(Temporary 6 Inch Black Pavement Marking Tape)

627.01 Description

The following sentence is added:

This work shall also consist of furnishing, placing, maintaining and removing temporary pavement marking tape at locations shown on the Plans or as directed by the Resident.

This work shall also consist of furnishing, placing, maintaining and removing temporary black pavement marking tape at locations shown on the Plans or as directed by the Resident. Temporary 6 Inch Black Pavement Marking Tape shall be used to cover conflicting existing pavement marking paint.

627.02 Materials

The following paragraph is added:

Temporary pavement marking tape shall be Stamark Wet Reflective Removable Pavement Marking Tape Series 710 as manufactured by 3M of St. Paul, Minnesota or an approved equal.

Temporary pavement marking tape shall be Stamark Removable Black Line Mask Tape Series 715 as manufactured by 3M of St. Paul, Minnesota or an approved equal.

627.04 General

The following paragraphs are added:

Work under this item shall be in accordance with the manufacturer's recommendations. A factory representative from 3M shall be present for the first application of all temporary pavement marking tape to insure proper application and product performance.

The pavement markings shall be applied mechanically to clean dry pavement as recommended by the manufacturer and approved by the Resident.

Temporary pavement markings shall consist of applying six inch solid white, six inch broken white, and six inch yellow reflectorized pavement marking tape for traffic maintenance during construction as shown on the Plans or as directed by the Resident.

Temporary pavement marking tape that loses reflectivity, becomes broken, dislodged or missing during the life of the Contract shall be replaced by the Contractor at no additional cost to the Authority.

627.06 Application

The following paragraphs are added:

For application of the tape, when the pavement temperature is below 50oF, heat shall be applied to the pavement surface, if deemed necessary by the factory representative or as directed by the Resident, at no additional cost to the Authority. Proper primer for the temperatures shall be used as directed by the manufacture.

The pavement mark tape shall be rolled over with a vehicle once application is complete and then scored every 20 feet when placed in long runs to prevent full length unraveling.

627.08 Removing Lines and Markings

The following sentence is added:

Removal of temporary pavement marking tape shall be accomplished without the use of heat, solvents, grinding or sandblasting and in such a manner that no damage to the pavement results.

627.09 Method of Measurement

The following paragraph is added:

Temporary Pavement Markings - Tape will be measured for payment by the linear foot. The measurement of broken lines will not include the gaps.

627.10 Basis of Payment

The following paragraphs are added:

Payment for the Temporary Pavement Markings - Tape will be made at the Contract bid price per linear foot, which price shall include furnishing, installing, maintaining and removing the temporary tape and all materials, labor, equipment and incidentals necessary to accomplish the work. Replacement of Temporary Pavement Markings - Tape, as described above, will be incidental and no separate payment will be made.

Payment for the Temporary 6 Inch Black Pavement Marking Tape will be made at the Contract bid price per linear foot installed, which price shall include furnishing, installing, maintaining and removing the temporary tape and all materials, labor, equipment and incidentals necessary to accomplish the work. Replacement of 6 Inch Black Temporary Pavement Marking Tape, as described above, will be incidental and no separate payment will be made.

Payment will be made under:

Pay Item		Pay Unit
627.73	Temporary 6 Inch Pavement Marking Tape	Linear Foot
627.731	Temporary 6 Inch Black Pavement Marking Tape	Linear Foot

SPECIAL PROVISION

SECTION 627

PAVEMENT MARKINGS

(White or Yellow Pavement Marking Line)

627.01 Description

The following sentences are added:

This work shall consist of furnishing and placing the final pavement markings at locations as shown on the Plans or as directed by the Resident.

The following sentence is added:

This work shall consist of furnishing and placing pavement marking paint and temporary pavement marking paint at locations as shown on the Plans or as directed by the Resident.

627.02 Materials

The following is added before the last paragraph:

The paint for pavement markings shall be 100% acrylic waterbase paint.

627.04 General

The following is added to the third paragraph:

Dotted white lines (DWL) shall consist of alternate 3 foot painted line segments and 9 foot gaps.

Permanent pavement marking paint shall be applied at the end of each work week prior to opening the work area to traffic or as approved by the Resident.

Temporary pavement marking paint and temporary pavement markers shall be applied daily prior to opening the work area to traffic during non-work hours or as approved by the Resident.

627.08 Removing Lines and Markings

The last sentence is deleted and is not replaced.

627.09 Method of Measurement

The second and third sentences in the second paragraph are deleted and replaced with the following:

The measurement of broken white lines, both permanent and temporary and dotted white lines, will include the gaps when painted. Temporary painted pavement marking lines will be measured for payment by the linear foot.

627.10 Basis of Payment

This Subsection is deleted and replaced with the following:

The accepted quantity of white or yellow pavement marking lines will be paid at the Contract price per linear foot. This price shall include all labor and materials to furnish, and install the paint line.

The accepted quantity of broken and dotted white pavement marking lines will be paid at the Contract price per linear foot. This price shall include all labor and materials to furnish and install the paint line.

The accepted quantity of temporary white or yellow pavement marking lines will be paid at the Contract price per linear foot. This price shall include all labor and materials to furnish, install and maintain the paint marking.

Payment will be made under:

Pay Item		Pay Unit
627.712	White or Yellow Pavement Marking Line	Linear Foot

SPECIAL PROVISION

SECTION 634

HIGHWAY LIGHTING

(Replacement LED Fixture)
(Remove and Reset Light Standard)
(Remove Existing Light Standard)
(Remove and Stack Light Standard)
(Conventional Light Standard with LED Fixture)

634.01 Description

The following paragraphs are added:

The work shall consist of verifying the voltage of existing luminaires and circuits, removing the existing luminaires and, if called for on the plans, furnishing and installing new LED luminaires with all new associated appurtenances at locations shown.

The work shall consist of removing existing light standards, luminaires, and any breakaway devices and resetting with associated appurtenances and wiring systems on new concrete foundations with new LED luminaires at locations as shown on the Plans.

The work shall consist of removing existing light standards, luminaries, and any breakaway devices, and their associated foundations. All existing light standards and associated appurtenances removed and not reset by the Contractor shall become the property of the contractor . All LED luminaires removed shall be reused and all non-LED luminaires removed, unless otherwise noted, will become the property of the contractor.

The work shall consist of furnishing and installing new conventional light standards with LED fixtures, including all appurtenances at locations shown. All new highway lights will have photoelectric sensors for each individual light. All new light standards shall be 35 feet tall with a 2-foot riser by 8-foot offset arm.

Existing lighting shall remain operational at all times until new luminaires are installed and operational. Existing luminaires, conduit and lighting standards shall be protected until approved by the Resident to be removed. Any temporary lighting that may be needed during removing and resetting of existing light standards shall be incidental to the 634 items.

634.02 General

The following paragraphs are added:

All Contract work shall be overseen by a Maine licensed Master Electrician. The lead person for the field installations shall be either a Maine licensed Master Electrician, or a Maine licensed Journeyman Electrician. Apprentice Electricians, Helper Electricians, Journeyman-In-

Training Electricians, and helpers may work under the Master or Journeyman Electrician as permitted under the law.

The Contractor shall comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical cable, wire and connectors; provide electrical cable, wire and connectors, which have been listed and labeled by Underwriters Laboratories, and comply with National Electrical Manufacturers Association/Insulated Power Cable Authorities Association Standards publications pertaining to materials, construction and testing wire cable, where applicable.

At a minimum the Contractor shall provide the following field quality control:

- Prior to energizing, check wire for continuity of circuitry and for short circuits with ohmmeter type testing equipment. Correct malfunction when detected.
- Subsequent to wire hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

634.021 Materials

The following paragraphs are added:

Disconnect fuse kits in pole bases shall be Ideal SLK Disconnect Fuse Kit 30-S2212, or similar approved Ideal SLK Disconnect Fuse Kit, matched to the pole wiring configuration.

The 120-277V Conventional Multi-Tap LED fixtures shall be one of the following:

- Model # ATB2-60BLEDE70-MVOLT-R3-NL-PCLL, as manufactured from American Electric Lighting
- Model # ATB2-80BLEDE70-MVOLT-R3-NL, as manufactured from American Electric Lighting

The 480V Conventional LED fixtures shall be one of the following:

- Model # ATB2-60BLEDE70-480VOLT-R3-NL, as manufactured from American Electric Lighting
- Satellite Series # SAT-96M-7-R-T3- 600GY-1-A-NS, as manufactured by LED Roadway Lighting of Halifax, Nova Scotia; (877) 533-5755
- LEDway Series # STR-LWY 3M HT 08 E UH SV 700 R, as manufactured by CREE, Inc., 4600 Silicon Drive, Durham, NC 27703
- Signify/Lumec Roadview LED Series RVS-135W80LED4K-LE3-HVU-GY3, as manufactured by Signify/Lumec,

The Contractor may submit an alternate LED fixture for review and acceptance or rejection. Alternate LED fixtures will need to meet or exceed the performance and efficiency of the specified fixtures. Should the Authority not accept the Contractor's proposed substitution the Contractor shall provide the specified fixture at no additional cost to the Authority.

Splices in junction boxes shall be made with Burndy UGS350ULDB Direct Burial/Submersible Splice Wire Range #12 AWG – 350KCMIL connectors for the appropriate wire count only.

The Manufacturer shall provide a minimum 5-year warranty on all fixtures, installed and spares, from the Project Completion date.

Each luminaire shall be provided with a 3 pin NEMA receptacle, a photocell and a shorting cap. All "spare" photocells and shorting caps shall become property of the Authority.

All fixtures shall be submitted and approved before the fixtures are ordered. Submittals shall include Product Data sheets clearly identifying the product and accessories being proposed, Test Reports and Certifications, and Product Warranties.

This item shall include the providing and installation of all AWG XHHW grade wire for highway lighting, as described herein, including grounding wires (where applicable), for all locations called for in the plans/specifications. All wire installed in conduit must be copper and direct burial grade, suitable for wet locations. Payment for all wiring for highway lighting will be incidental to the 634 items.

634.04 Cable Installation

The reset light standards that do not have a disconnect fuse kit or have a damaged or un-suitable disconnect fuse kit in the pole base, shall have a new disconnect fuse kit installed. The work will be included in the payment for reset light standard.

The reset light standards where the existing wire(s) at the luminaire or base are brittle and there is insufficient slack in the wire(s) to cut out the brittle portions of wire(s) and properly reset the light standard, shall have new wire(s) installed from the LED fixture to the (existing or new) disconnect fuse kit in the pole base. The work will be included in the payment for reset light standard.

634.051 Removing Light Standards

The first paragraph is deleted and replaced with the following:

Before removing light standards, the luminaires shall be removed from the light standard and stacked.

The Contractor will not be allowed to remove the existing light standards until all new foundations, wiring, conduits and junction boxes have been installed. Existing light levels shall be maintained while new light standards are being installed and made fully operational. New breakaway devices and mounting hardware shall be required on all reset and proposed light standards. If breakaway devices do not exist on the existing light standard, new breakaway devices shall be supplied and installed. For all entrance ramp, exit ramp, interchange, and toll plaza lighting locations, the Contractor will be allowed the daylight hours within one (1) working day to remove and reset a light standard, including installing the luminaire and testing.

634.06 Luminaires

The second paragraph is revised to read:

The connections between the luminaires and connector kits shall be made with number 10 wires AWG copper stranded XHHW, minimum size. A 14-inch-long Teflon sleeve shall be placed over each end of each conductor in the luminaire.

634.092 Method of Measurement

The following sentence is added:

Verifying the voltage of the existing luminaire(s) before installing the new LED luminaire(s) will not be paid separately but shall be incidental to the Replacement LED Fixture pay item.

Confirming if the existing pole(s) have a disconnect fuse kit in the base, providing and installing if none present, will not be paid separately, but shall be incidental to the Replacement LED Fixture, Remove and Rest Light Standard, and Conventional Light Standard pay item.

Replacement LED Fixture, Remove and Reset Light Standard, Remove and Stack Light Standard, Remove Existing Light Standard, and Conventional Light Standard with LED Fixture will be measured by the single unit, complete in place and accepted.

634.093 Basis of Payment

The following paragraphs are added:

Payment for furnishing and installing Replacement LED Fixture will be made for the accepted quantity at the Contract unit price per each, which shall include verifying the existing fixture and circuit voltage, removing and disposing the existing luminaire, confirming if the existing pole has a disconnect fuse kit in the base, new disconnect fuse kit if needed, furnishing and installing the new LED fixture, and all incidentals necessary to complete the work.

Payment for Remove and Reset Light Standard will be paid at the Contract unit price each for the number of units that are removed and reset. Payment shall be full compensation for the removal and resetting of the light standard, including luminaires, new breakaway device installed, new pole wires, new disconnect fuse kit, removal and delivering existing precast foundations suitable for reuse to the MTA Crosby Maintenance Facility, and all incidentals necessary to provide a complete and working light standard as shown on the plans.

Payment for Remove and Stack Light Standard will be made for the Contract unit price each for the accepted quantity. Payment shall include all incidentals necessary to reestablish the existing electrical circuit after light standard removal. Payment shall be full compensation for removing the light standard and delivering to the MTA Cumberland Maintenance Facility and removal and delivering existing precast foundations suitable for reuse to the MTA Crosby Maintenance Facility. Foundations removed and not suitable for reuse shall become the property of the contractor and payment incidental to the Remove and Stack Light Standard item.

Payment for Remove Existing Light Standard will be made for the Contract unit price each for the accepted quantity. Payment shall be full compensation for removing the light standard and all associated appurtenances and removing from the site. Payment shall include all incidentals necessary to reestablish the existing electrical circuit after light standard removal.

Payment for Conventional Light Standard with LED Fixture will be made for the accepted quantity at the Contract unit price each. Payment shall be full compensation for the light standard, breakaway device, bracket arm, new LED fixture, ballast, lamp, fixture mounted photocell, disconnect fuse kit and all incidentals to complete the work.

Payment will be made under:

Pay Item		Pay Unit
634.175	Replacement LED Fixture	Each
634.208	Remove and Reset Light Standard	Each
634.2082	Remove Existing Light Standard	Each
634.2083	Remove and Stack Lighting Standard	Each
634.231	Conventional Light Standard with LED Fixture	Each

SPECIAL PROVISIONS

SECTION 634

HIGHWAY LIGHTING

(Temporary Lighting)

634.01 Description

The following paragraph is added:

This work shall consist of maintenance of existing lighting, installing and removing temporary lighting, and relocating temporary lights in accordance with these Specifications and at locations for project phasing as shown on the Plans. The existing light standards, luminaries, and foundations may be utilized as temporary lights.

The Cumberland service plaza maintains 24 hour operations and therefore lighting shall be provided for the complete nighttime duration.

Temporary Lighting may not be powered by portable generators.

If necessary, disruption to existing ramp lighting is permitted during daylight hours in order to tie into power source. Contractor shall verify voltage of all electrical circuits before any changes are made.

634.021 Materials

The following sentence is added:

Temporary roadway luminaries shall provide a minimum of 0.6 candle power in the parking areas.

The following Subsection is added:

634.053 Conductors

Conductors for temporary lighting shall be constructed utilizing techniques approved by the Resident. Shop drawings showing the proposed temporary lighting route and details shall be submitted by the Contractor for approval prior to the commencement of the work.

If approved, conductors may be hung from pole to pole in free air. Conductors hung from pole to pole shall have a sag that allows for a minimum vertical clearance from the conductor to the traveled way of no less than 20 feet.

634.092 Method of Measurement

The following sentence is added:

Temporary Lighting shall be measured for payment by the lump sum at each plaza.

634.093 Basis of Payment

The following sentences are added:

The accepted Temporary Lighting will be paid for at the contract lump sum price for each plaza. Lump sum payment shall be full compensation for furnishing, installing and erecting: ballasts, lamps, conduit, all wiring, breakaway devices when applicable, and all materials, labor, equipment and tools necessary to provide a fully operational temporary lighting system at each plaza.

Payment will be made under:

Pay Item		Pay Unit
634.23	Temporary Lighting	Lump Sum

SPECIAL PROVISION

SECTION 645

HIGHWAY SIGNING

(Remove and Reset Sign)
(Remove and Stack Sign)

645.07 Demounting and Reinstalling Existing Signs and Poles

The following paragraphs are added:

At locations noted on the Plans, existing ground-mounted signs are designated to be removed and reset. This work shall consist of removing the sign panels, removing and resetting or disposing of the existing wood post and resetting the sign panels on a new wood post if required in the appropriate specified location. The Resident will determine if a new wood post is required.

Any existing signs not shown on the Plans are to remain in their existing condition unless directed otherwise by the Resident.

645.08 Method of Measurement

The following sentences are added:

Removing and Resetting existing ground-mounted signs shall be measured as complete units each, removed, reset and accepted.

645.09 Basis of Payment

The following paragraphs are added:

The accepted signs Removed and Reset will be paid for at the Contract unit price each as specified. Such price will include removing and resetting sign panels, removing and resetting or disposing existing wood post and resetting the sign panels on the existing or new wood post and new hardware as required to complete the sign installation. Any signs or supports damaged by the Contractor shall be replaced by him with new signs or supports conforming to the applicable Specifications at no additional cost to the Authority.

Payment will be made under:

Pay Item		Pay Unit
645.109	Remove and Reset Sign	Each

SPECIALPROVISION

SECTION 645

HIGHWAY SIGNING

(Protection of Signs with Type XI Sheeting)

645.04 Fabrication of Type I Guide Signs

The following paragraphs are added after the second paragraph in part b. Reflective Sheeting:

The Contractor and Sign Fabricator shall exercise all due caution to avoid any creases, bends, tears, punctures, or other damage to any Type XI sign sheeting, perceptible or not. Sign sheeting shall be protected at all times following application to the extruded aluminum surface. Any defect which becomes perceptible either under direct, indirect or no light conditions shall be cause for rejection of the sign panel.

Following the application of the sign legend and borders, the sign panel shall be protected from all hazards that may cause a defect to the sign sheeting (either background, legend or borders) in accordance with the manufacturer's recommendations. Fabricated signs shall not be stacked during storage, transport, or erection such that concentrated pressure is placed on one area of the sign face that is not uniform across the full sign face.

645.08 Method of Measurement

The fifth (5th) paragraph is deleted and replaced by the following paragraph:

The area of roadside guide signs, regulatory, warning, confirmation and route marker assembly signs of the respective types, will be measured by the area in square feet, computed to the nearest hundredth of a square foot (0.01 SF), as determined by the overall height multiplied by the overall width. Any defect in the surface area of the sign that becomes perceptible under direct, indirect, or no light conditions shall be cause for rejection of the whole sign panel.

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

(Specific Project Maintenance of Traffic Requirements)

This Specification describes the specific project maintenance of traffic requirements for this Project.

The following minimum traffic requirements shall be maintained:

Soutbound Service Area Traffic Control Requirements

- Access to the gas islands and diesel islands, temporary or permanent, shall be maintained at all times. Access along Perimeter Road either along its current alignment or to and through the truck parking area on the south side of the facility shall be maintained at all times. See the MOT plans for detailed information on passage through the site during construction.

Some trench activities across pavement will be considered favorably for night work. The Contractor shall submit a request, in writing to the Resident. The approval will be at the Resident's discretion and will not be unreasonably withheld.

652.3.5 Installation of Traffic Control Devices

The Portable Changeable message sign shall be installed on the mainline a minimum of two weeks prior to the temporary fueling systems being operational.

SPECIAL PROVISION

SECTION 652

MAINTENANCE OF TRAFFIC

MaineDOT Standard Specification 2014 Edition Section 652 – Maintenance of Traffic and the Maine Turnpike Authority 2016 Supplemental Specification Section 652 – Maintenance of Traffic are deleted in their entirety and replaced with the following:

652.1 Description

This work shall consist of furnishing, installing, maintaining and removing traffic control devices necessary to provide reasonable protection for motorists, pedestrians and construction workers in accordance with these Specifications, the applicable provisions of Section 105.4.5 - Special Detours, and the plans.

Traffic control devices include signs, signals, lighting devices, markings, barricades, channelizing, and hand signaling devices, portable light towers, truck mounted impact attenuators, portable rumble strips, portable speed trailers, sequential warning lights, traffic officers, and flaggers.

652.2 Materials

All maintenance of traffic control devices shall conform to the requirements of the latest edition of the MUTCD, NCHRP 350 guidelines and all Traffic control devices shall meet Manual for Assessing Safety Hardware (MASH) 16 guidelines if date of manufacture was after December 31, 2019.

All signs shall be fabricated with high intensity fluorescent retroreflective sheeting conforming to ASTM D 4956 - Type VIII, or Type IX (prismatic). All barricades, drums, and vertical panel markers shall be fabricated with high intensity orange and white fluorescent retroreflective sheeting conforming ASTM D 4956 - Type VII, Type VIII, or Type IX (prismatic).

Construction signs shall be fabricated from materials that are flat, free from defects, retroreflectorized, and of sufficient strength to withstand deflections using a wind speed of 80 miles/hr.

652.2.2 Signs

Only signs with symbol messages conforming to the design of the Manual of Uniform Traffic Control Devices (MUTCD) shall be used unless the Resident approves the substitution of word messages.

Any proposed use of temporary plaques to cover text or to change text shall be approved by the resident. All signs or proposed plaques shall have a uniform face and be constructed from similar sheeting.

All signs shall be new, or in like new condition and maintained in like new condition throughout the project duration. Signs shall be cleaned just prior to installation and throughout the project utilizing a method that will not damage the reflective sign sheeting.

652.2.3 Flashing Arrow Board

Flashing Arrow Boards must be of a type that has been submitted to AASHTO's National Transportation Product Evaluation Program (NTPEP) for evaluation and placed on the Maine Department of Transportations' Approved Products List of Portable Changeable Message Signs & Flashing Arrow Boards.

Flashing Arrow Boards units shall meet requirements of the current Manual on Uniform Traffic Control Devices (MUTCD) for Type "C" panels as described in Section 6F.56 - Temporary Traffic Control Devices. Flashing Arrow Boards shall have matrix of a minimum of 15 low-glare, sealed beam, Par 46 elements capable of either flashing or sequential displays as well as the various operating modes as described in the MUTCD, Chapter 6-F. If a Flashing Arrow Board consisting of a bulb matrix is used, each element should be recess-mounted or equipped with an upper hood of not less than 180 degrees. The color presented by the elements shall be yellow.

Flashing Arrow Board elements shall be capable of at least a 50 percent dimming from full brilliance. Full brilliance should be used for daytime operation and the dimmed mode shall be used for nighttime operation. Flashing Arrow Board shall be at least 96 inches x 48 inches and finished in non-reflective black. The Flashing Arrow Board shall be interpretable for a distance not less than 1 mile.

Operating modes shall include, flashing arrow, sequential arrow, sequential chevron, flashing double arrow, and flashing caution. In the three arrow signals, the second light from the arrow point shall not operate.

The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate shall be not less than 25 nor more than 40 flashes per minute. All on-board circuitry shall be solid state.

Primary power source shall be 12 volt solar with a battery back-up to provide continuous operation when failure of the primary power source occurs, up to 30 days with fully charged batteries. Batteries must be capable of being charged from an onboard 110 volt AC power source and the unit shall be equipped with a cable for this purpose.

Controller and battery compartments shall be enclosed in lockable, weather-tight boxes.

The Flashing Arrow Board shall be mounted on a pneumatic-tired trailer or other suitable support for hauling to various locations, as directed. The minimum mounting height of an arrow panel should be 7 feet from the roadway to the bottom of the panel.

The face of the trailer shall be delineated on a permanent basis by affixing retro-reflective material, known as conspicuity material, in a continuous line as seen by oncoming drivers.

A portable changeable message sign may be used to simulate an arrow panel display.

652.2.4 Other Devices

Vertical panel markers shall be orange and white striped, 8 inches wide by 24 inches high. On the Interstate System, vertical panel markers shall be orange and white striped, 12 inches wide by 36 inches high.

Cones shall be orange in color, a minimum of 28 inches high, and retro-reflectorized. Retro- reflection shall be provided by a white bands of retro-reflective sheeting conforming to the MUTCD. All cones utilized on the project shall be new or in like new condition and shall have a consistent design/appearance.

Drums shall be of plastic or other yielding material and shall be a minimum of 36 inches high and a minimum of 18 inches in diameter. There shall be at least two retro-reflectorized orange and at least two retro-reflectorized white stripes a minimum of 4 inches wide on each drum. All drums utilized on the project shall be new or in like new condition and shall have a consistent design/appearance.

Flaggers shall use a STOP / SLOW handheld paddle as the primary and preferred hand signaling device. Flags shall only be limited to emergencies. STOP / SLOW paddles shall have high intensity prismatic retro reflective sheeting, have an octagonal shape on a rigid handle and shall be at least 18 inches wide with letters at least 6 inches high and shall be constructed from light semi-rigid material. The STOP (R1-1) face shall have white letters and a white border on a red background. The SLOW (W20-8) face shall have black letters and a black border on an orange background.

STOP / SLOW paddles shall also incorporate either white or red flashing lights on the STOP face and white or yellow flashing lights on the SLOW face of the paddle and always be in use.

Paddles must conform to one of the following patterns:

A. Two white or red lights (colors shall be all white or all red), one centered vertically above and one centered vertically below the STOP legend; and/or two white or yellow lights (colors shall be all white or all yellow), one centered vertically above and one centered vertically below the SLOW legend.

B. Two white or red lights (colors shall be all white or all red), one centered horizontally on each side of the STOP legend; and/or two white or yellow lights (colors shall be all white or all yellow), one centered horizontally on each side of the SLOW legend.

C. One white or red light centered below the STOP legend; and/or one white or yellow light centered below the SLOW legend.

D. A series of eight or more small all white or all red lights no larger than 1/4 inch in diameter along the outer edge of the paddle, arranged in an octagonal pattern at the eight corners of the border of the STOP face; and/or a series of eight or more small all
white or all yellow lights no larger than 1/4 inch in diameter along the outer edge of the paddle, arranged in a diamond pattern along the border of the SLOW face; or

E. A series of white lights forming the shapes of the letters in the legend. Flashing light patterns shall be compliant with Section 6E.03 Hand Signaling Devices in the most current version of the Manual on Uniform Traffic Control Devices.

All flashing light patterns on the STOP / SLOW paddle shall be visible from a minimum distance of 1000 feet.

Type I barricades shall be 2 feet minimum, 8 feet maximum in length with an 8 inch wide rail mounted 3 feet minimum above the ground. Type II barricades shall be 2 feet in length with two 8 inch wide rails, and the top rail shall be mounted 3 feet minimum above the roadway. Type III barricades shall be 8 feet in length with three 8 inch wide rails, and the top rail shall be mounted 5 feet minimum above the roadway. The cross members of all barricades shall be of ½ or ⅝ inch thick plywood or other lightweight rigid material such as plastic, fiberglass or fiber wood as approved by the Resident. The predominant color for supports and other barricade components shall be white, except that unpainted galvanized metal or aluminum components may be used.

652.2.5 Portable Changeable Message Sign

Portable-Changeable Message Signs (PCMS) will be furnished by the Contractor and shall be Ver-Mac PCMS-1210 or an approved equal. The face of the PCMS trailer shall be delineated on a permanent basis by affixing retro-reflective material, known as conspicuity material, in a continuous line as seen by oncoming drivers. PCMS's shall be located and relocated to locations approved by the Resident within the Project limits for the duration of the Project.

Features to the Ver-Mac PCMS shall include:

- An all-LED display.
- Be legible from a distance of 1,000 feet.
- Have three (3) lines available for messages.
- Be NTCIP compliant (NTCIP 1203 & 1204).
- Be capable of being programmed by a remote computer via a data (IP over Cell) cellular modem connection.
- Have GPS location capability by adding on a GPS device capable of providing GPS location remotely to the MTA Communications' Center.

- Be programmable by Vanguard Software by Daktronics.

The Contractor shall complete and/or provide the following:

- Submit a catalog cut shop drawing to the Resident of all proposed equipment for review and approval.
- Establish and pay for a data cellular account so that PCMS may be remotely programmed and operated from the MTA Communications' Center.

- Provide to the Authority technical support from the PCMS manufacturer that may be necessary to integrate the PCMS into the MTA software platform (Vanguard Software by Daktronics).

- Provide the manufacturer's software necessary to change the PCMS messages remotely from the MTA Communications' Center and the Resident's computer if necessary or requested.

- Provide training on the operation of the PCMS to the Resident and the MTA Communications' Center representative.

- Make all PCMS on the Project work site available to the MTA for any/all emergency situations as defined by the MTA. This shall include the preemption of any messages running at the time of need as approved by the MTA and the Resident.

The Contractor shall also:

- Furnish, operate, relocate and maintain the PCMS as approved or requested by the Resident.

- Be responsible for the day-to-day programming and operation of the PCMS for Project purposes.

The PCMS(s) shall be on-site, with data cellular account established, GPS location capable, and all training required complete within one month after mobilization or seven days prior to implementing traffic shifts, detours or stoppages, whichever is sooner. Implementation of traffic shifts, detours, or stoppages of traffic will not be allowed without PCMS boards on-site with the specified MTA Communications' Center Software Platform integration and training.

652.2.5 Truck Mounted Attenuator

The truck mounted attenuator system shall conform to the following requirements:

- Truck and attached attenuator shall conform to the NCHRP Report 350, Test Level 3 criteria or MASH if manufactured after 2019.
- Amber, Green, white or any variation of those colors strobe lights with 360-degree visibility.
- An arrow light bar fixed to the vehicle.

- The attenuator shall be mounted to a vehicle with a minimum weight of 24,000 lbs. unless otherwise specified.

Installation: **The TMA shall be located in the closed lane adjacent to active traffic; for double lane closures, only the outer closed lane requires the TMA**. If a buffer zone is required the TMA shall not be located in the buffer zone. The shadow vehicle shall have its front wheels turned away from the work area and from traffic, have parking brake set, and be put in park if an automatic transmission; or if a manual transmission it shall have its front wheels turned away from the work area and from traffic, have parking brake set and should be placed in gear and shut off if possible while still maintaining warning lights. If length of time or weather are a concern for the battery since the warning lights must be maintained the engine should be started and run periodically for battery recharging. No other vehicles or equipment shall park in front of the shadow vehicle or within the buffer space behind the shadow vehicle. For placement details, reference the Manual on Uniform Traffic Control Devices (MUTCD).

A Truck Mounted Attenuator **shall** be utilized in all lane closures, and shoulder closures, where workers are not protected by other positive means (i.e., closures that do not include temporary concrete barrier). If work is being completed behind guardrail a TMA shall be required for all work that is being completed within the deflection zone of the guardrail (minimum of four feet behind the guardrail post).

The placement and positioning of the vehicle shall be in accordance with the Manual on Uniform Traffic Control Devices and the manufacturer's recommendation. TMAs used on the Turnpike mainline shall have a minimum weight of 24,000 lbs and shall provide a 200 foot shadow distance from vehicles or the work zone. **For lane and shoulder closures in excess of 3,000 feet containing multiple work zones a TMA shall be used at each work zone.**

If a Truck Mounted Attenuator is not used as described above, then it will be considered a Traffic Control Plan violation and result in a reduction of payment as outlined in Section 652.

652.2.6 Sequential Flashing Warning Lights

When included in contracts as a bid item Sequential Flashing Warning Lights on drums used for merging tapers and shifting tapers during nighttime operation for project use. The purpose of these lights is to assist the motorist in determining which direction to merge or shift and to reduce the number of late merges resulting in devices being struck and having to be reset to maintain positive guidance at the merge point. The successive flashing of the lights shall occur from the upstream end of the taper to the downstream end of the taper in order to identify the desired vehicle path.

The Sequential Flashing Warning Lights shall meet all of the requirements for warning lights within the current edition of the MUTCD. Each light unit shall be capable of operating fully and continuously for a minimum of 500 hours when equipped with a standard battery set. Each light in sequence shall be flashed at a rate of not less than 55 times per minutes and not more than 75 times per minute. The flash rate and flash duration shall be consistent throughout the sequence.

Sequential Flashing Warning Lights shall be "Pi-Lit" Sequential Barricade Warning Lamps or an approved equal.

Sequential Flashing Warning lights are to be used for merging and shifting tapers that are in place during the nighttime hours (12-hours when ambient light is dimmed). These lights shall flash sequentially beginning with the first light and continuing until the final light at the beginning of a tangent section.

The Sequential Flashing Warning Lights shall automatically flash in sequence when placed on the drums that form the merging or shifting tapers.

The number of lights used in the drum taper shall equal one half the number of drums used in the taper.

Drums are the only channelizing device permitted for mounting the Sequential Flashing Warning Lights.

The Sequential Flashing Warning Lights shall be weather independent and visual obstruction shall not interfere with the operation of the lights.

The Sequential Flashing Warning Lights shall automatically sequence when placed in line in an open area with a distance between lights of 25 to 150 feet. A 10-foot stagger in the line of lights shall have no adverse effect on the operation of the lights.

If one light fails, the flashing sequence shall continue. Non-sequential flashing is prohibited.

652.2.7 Automated Trailer Mounted Speed Sign

The Contract will furnish, operate, and maintain Automated Trailer Mounted Speed Limit Sign(s) for project use. The automated speed sign shall be required when there is a Work Zone Speed Limit in place. The Contractor shall furnish, operate, and maintain the Automated Trailer Mounted Radar Speed Limit Signs during the project operations

Trailer mounted speed limit signs shall be self-contained units including sign assembly, flashing lights, directional radar to measure speed limits, a regulatory speed limit sign, andpower supply specifically constructed to operate as a trailer-mounted sign. The preferred color of the unit shall be “construction orange”.

Base material for the regulatory speed limit signs shall be weatherproof, rigid substrate specifically manufactured for highway signing and meet the retro-reflective sheeting application requirements of the sheeting manufacturer.

Sign text shall consist of the letters, digits and symbols either applied by stick-on or silk screen, to conform to the dimensions and designs indicated in the Contract, MUTCD and/or FHWA Standard Highway Signs. The materials and methods shall be in accordance with standard commercial processes.

“Work Zone” construction signs shall be mounted on the trailer unit above the regulatory speed limit sign. (see attached graphic details).

Signs and secondary signs shall follow the MUTCD for minimum mounting heights.

The power supply shall be either full battery power with solar panel charging (capable of maintaining a charged battery level) and 135 amperes, 12-volt deep cycle batteries, or diesel powered generator with a fuel capacity sufficient for 10 hours of continuous operation.

Each unit shall be equipped with two mono-directional flashing lights, placed in accordance with the MUTCD, with amber lenses and reflectors, which are visible through a range of 120 degrees when viewed facing the sign. The lights shall be a minimum of 8-inch diameter, either LED, halogen, or incandescent lamps, and shall be visible for a minimum distance of one mile under daylight conditions and shall have a minimum flash rate of 40 flashes per minute. An "On" indicator light shall be mounted on the back of the signs, which is visible for at least 500 feet to provide confirmation that the flashing lights are operating.

The directional radar shall monitor approaching traffic only. The radar shall be capable of measuring speeds from 5 to 70 MPH at a distance of up to 1500 feet and shall have a high speed cut off thresh hold. Speed data shall be recorded and stored on the sign and must be made available to the Authority as requested.

All existing speed limit signs, which conflict with the construction zone trailer mounted speed limit signs shall be covered completely when the work zone speed limit is in place.

Automated Trailer Mounted Speed Limit Signs shall only be used when a work zone speed limit is in place **and shall be required when the work zone speed limit is active**. The Contractor shall manage the utilization and operation of the Automated Trailer Mounted Speed Limit Signs and if at least one is not used when work zone speed limits are in place then it will be considered a Traffic Control Plan violation and result in a reduction of payment as outlined in Section 652.

The Resident will record the actual time and location for the signs on a daily basis when the Automated Trailer Mounted Speed Limit Signs are in use.

The Automated Trailer Mounted Radar Speed Limit Sign may be placed as shown on the plans, or may replace the posted regulatory speed limit signs, or may be placed at a location within the closed lane that has a reduced speed limit.

Automated Trailer Mounted Speed Limit Signs shall be delineated with retro-reflective temporary traffic control devices while in use and shall also be delineated by affixing a retro-reflective material directly on the trailer.

Upon delivery of the Automated Trailer Mounted Speed Limit Sign and before acceptance by the Authority, the Contractor shall have a representative of the manufacturer review the condition and notify the Resident in writing, of all deficiencies noted.

The Contractor shall arrange to have all necessary repairs performed at no cost to the Authority.

To avoid impairing driver vision, the Contractor shall dim the lighted speed limit readings by 50 percent during nighttime use and restore full power lighting during daytime operation.

652.2.8 Temporary Portable Rumble Strips

If a pay item is included in the contract or the Contract desires to utilize Temporary Portable Rumble Strips this work consists of furnishing and placing temporary portable rumble strips RoadQuake 2F TPRS or an approved equal. Furnishing a temporary portable rumble strip system includes a method to transport and move these to on-site locations where they will be used. The Contractor shall submit for approval, literature and all necessary certifications to the Maine Turnpike prior to procurement of the product.

If used, Temporary Portable Rumble Strips may not be practicable in areas where the roadway has more than two travel lanes, where volume windows do not allow for breaks in traffic to set up and monitor and adjust, or during nighttime lane closures.

Provide rumble strips where the plans show or as directed by the Resident as follows:

Prior to placing rumble strips, clean the roadway of sand and other materials, that may cause slippage.

Place one end of the rumble strips 6 inches from the roadway centerline. Extend the strips perpendicular to the direction of travel. Ensure strips lay flat on the roadway surface.

Only one series of rumble strips, placed before the first work zone, is required per direction of travel for multiple work zones spaced 1 mile or less apart. Work zones spaced greater than 1 mile apart require a separate series of rumble strips. Each lane shall use one group of temporary rumble strips.

Bracketed “Rumble Strip Ahead” and “Bump” signs shall be utilized and will be paid for under the respective construction sign pay items.

Maintain rumble strips as follows:

If rumble strips slide, become out of alignment, or are no longer in the wheel path of approaching vehicles during the work period, thoroughly clean both sides of the rumble strips and reset on a clean roadway.

Repair or replace damaged rumble strips immediately.

652.3.1 Responsibility of the Authority

The Authority will provide Project specific traffic control requirements and traffic control plans for use by the Contractor. The specific traffic control requirements for the Project are identified in Special Provision Section 652, Maintenance of Traffic (Specific Project Maintenance of Traffic Requirements). No revisions to these requirements or Plans will be permitted unless the
Contractor can thoroughly demonstrate an overall benefit to the public and a Contract Modification is approved.

The Maine Turnpike Authority may erect lane closures on the mainline within the Project area to collect survey, provide layout, and for any other reasons deemed necessary by the Authority.

652.3.2 Responsibility of the Contractor

The Contractor shall provide continuous and effective traffic control and management for the Project that is appropriate to the construction means, methods, and sequencing allowed by the Contract and selected by the Contractor:

The Contractor shall ensure all jobsite personnel shall wear a safety vest labeled as ANSI 107-2004 standard performance for Class 3 risk exposures at all times. This requirement also applies to truck drivers and equipment operators when out of an enclosed cab.

652.3.3 Submittal of Traffic Control Plan

The Contractor shall provide continuous and effective traffic control and management for the Project that is appropriate to the means, methods and sequencing allowed by the Contract; and consistent with the Traffic Control Plans and Maintenance of Traffic Specifications. The Contractor is responsible for ensuring a safe environment for the Contract workforce, local road users, and turnpike users; and maintaining the safe efficient flow of traffic through the construction zone at all times during the Contract. The protocols and requirements outlined in the Contract shall be strictly enforced. The Contractor shall submit, at or before the Preconstruction Meeting, a Traffic Control Plan (TCP) that provides the following information to the Authority:

a. The name, telephone number, and other contact numbers (cellular phone, pager, if any) of the Contractor's Traffic Control Supervisor (TCS). The TCS is the person with overall responsibility for ensuring the contractor follows the TCP, and who has received Work Zone Traffic Control Training commensurate with the level of responsibility shown in the requirements of the Contract, and who is empowered to immediately resolve any work zone traffic control deficiencies or issues. Provide documentation that the Traffic Control Supervisor has completed a Work Zone Traffic Control Training Course (AGC, ATSSA, or other industry- recognized training), and a Supervisory refresher training every 5 years thereafter. Submit training certificates or attendance roster that includes the course name, training entity, and date of training. **State how the traffic control devices will be maintained including a frequency of inspection for both temporary and permanent traffic control devices.**

Traffic Control Training Course curriculum must be based on the standards and guidelines of the MUTCD and must include, at a minimum, the following:

1. Parts of Temporary Traffic Control Zone
2. Appropriate use and spacing of signs
3. Use and spacing of channelizing devices
4. Flagging basics

5. Typical examples and applications

The Traffic Control Supervisor, or designee directly overseeing physical installation, adjustment, and dismantling of work zone traffic control, will ensure all personnel performing those activities are trained to execute the work in a safe and proper manner, in accordance with their level of decision-making and responsibility. The emergency contact list shall contain a listing of individuals who may be contacted during non-work hours and shall adequately respond to the request.

b. Proposed revisions to the construction phasing or sequencing that reasonably minimizes traffic impacts.

c. A written narrative and/or plan explaining how traffic and pedestrians will be moved through the Project Limits, including transitions during the change from one phase of construction to the next, as applicable.

d. Temporary traffic control treatments at all intersections with roads, rail crossings, businesses, parking lots, pedestrian ways, bike paths, trails, residences, garages, farms, and other access points, as applicable.

e. A list of all Contractor or Subcontractor certified flaggers to be used on the Project, together with the number of flaggers which will be used for each type of operation that flagging is needed. If the Contractor is using a flagging Subcontractor, then the name and address of the Subcontractor may be provided instead of a list of flaggers.

f. A procedure for notifying the Resident of the need to change the traffic control plan or the need to remove a lane restriction.

g. A description of any special detours including provisions for constructing, maintaining, signing, and removing the detour or detours, including all temporary bridges and accessory features and complete restoration of the impacted land.

h. The maximum length of requested contiguous lane closure. The Contractor shall not close excessive lengths of traffic lane to avoid moving traffic control devices.

i. The proposed temporary roadway surface conditions and treatments. The Contractor shall provide an adequate roadway surface at all times; taking into account traffic speed, volume, and duration.

j. The coordination of appropriate temporary items (drainage, concrete barriers, barrier end treatments, impact attenuators, and traffic signals) with the TCP.

k. The plan for unexpected nighttime work, the contractor shall provide a list of emergency nighttime lighting equipment and safety personnel available on-site or have the ability to have them on site within an hour of the time of need.

l. The plan for meeting any project specific requirements contained in special provision 105 and/or 107, and/or Section 656

m. The lighting plan if night work is anticipated.

The Authority will review the TCP for completeness and conformity with Contract provisions, the current edition of the MUTCD, and Authority policy and procedures. The Authority will review and provide comments to the Contractor within 14 days of receipt of the TCP. No review or comment by the Authority, or any failure to review or comment, shall operate to absolve the contractor of its responsibility to design and implement the plan in accordance with the Contract, or to shift any responsibility to the Authority. If the TCP is determined by the Authority to be operationally ineffective, the Contractor shall submit modifications of the TCP to the Authority for review and shall implement these changes at no additional cost to the Contract. Nothing in this Section shall negate the Contractor's obligations set forth in Section 110 - Indemnification, Bonding, and Insurance. The creation and modification of the TCP will be considered incidental to the related 652 items.

652.3.4 General

Prior to starting any work on any part of the project adjacent to or being used by the traveling public, the Contractor shall install the appropriate traffic control devices in accordance with the plans, specifications and the latest edition of Manual of Uniform Traffic Control Devices, Part VI. The Contractor shall continuously maintain the traffic control devices in their proper position, and they shall be kept clean, legible and in good repair throughout the duration of the work. If notified that the traffic control devices are not in place or not properly maintained, the Contractor may be ordered to immediately suspend work until all deficiencies are corrected.

No equipment or vehicles of the Contractor, their subcontractors, or employees engaged in work on this contract shall be parked or stopped on lanes carrying traffic, or on lanes or shoulders adjacent to lanes carrying traffic, at any time, except as required by ongoing work operations. Contractor equipment or vehicles shall never be used to stop, block, or channelize traffic.

Vehicles parked on the shoulder shall be located so all portions of the vehicle(s) are a minimum of one foot from the traveled way. No operation shall be conducted on or near the traveled lanes or shoulders without first setting up the proper lane closure and traffic control devices. These precautions shall be maintained at all times while this Work is being performed. The Contractor shall keep all paved areas of the highway as clear as possible at all times. No materials shall be stored on any paved area of the highway or within 30 feet of the traveled way (unless protected by concrete barriers and specifically approved by the Resident). Private vehicles owned by Contractor's employees shall be parked close together in a group no closer than 30 feet from the traveled way in pre-approved areas.

Channelization devices shall include Vertical Panel Markers, Barricades, Cones, and Drums shall be in accordance with the MUTCD. These devices shall be installed and maintained at the spacing determined by the MUTCD through the work area.

The Contractor shall maintain existing guardrails and/or barriers until removal is necessary for construction. The Contractor shall use a temporary barrier or appropriate channelizing devices,
as approved by the Resident, while the guardrails and/or barriers are absent. Permanent guardrails and barriers shall be installed as soon as possible to minimize risk to the public.

When Contractor operations or shoulder grading leave a continuous 3 inch or less exposed vertical face at the edge of the traveled way, including the shoulder, or when traffic is shifted into the shoulder adjacent to the edge of pavement where an existing 3 inch or less exposed vertical face creates a safety hazard, channelization devices should be placed 2 feet outside the edge of the pavement at intervals not exceeding 600 feet and, depending on type and location of the exposed vertical face, a 48 inch by 48 inch W8-9 Low Shoulder, or W8-11 Uneven Lane, and/or a W8-17P Shoulder Drop-Off sign should be placed at a maximum spacing of ½ mile. When Contractor operations or shoulder grading leave greater than a 3-inch exposed continuous vertical face at the edge of the traveled way, including the shoulder, or when an existing condition of an exposed vertical face of 3 inches or more is adjacent to active traffic shifted into shoulder, the Contractor shall place shoulder material at a slope not exceeding 3 horizontal to 1 vertical to meet the pavement grade, before the lane is opened to traffic.

Special Detours and temporary structures, if used, shall meet applicable AASHTO standards, including curve radii and grade.

Maine Turnpike Traffic Control Requirements

This Section outlines the minimum requirements that shall be maintained for working on, over, or adjacent to the Maine Turnpike roadway.

General

Two travel lanes in each direction (each direction being 24 feet wide including/excluding shoulder) in the two lane portion of the turnpike, and three travel lanes in each direction (each direction being 36 feet wide including/excluding shoulder) in the three lane portion of the turnpike (Mile 0.0 to mile 44.3) shall be maintained at all times except while performing work in a designated lane, directly over or adjacent to traffic, and during the placement and removal of traffic control devices.

Unless otherwise specified in the contract documents the minimum main line width for a single travel lane shall be 14 ft and minimum ramp widths of 16 ft which must be maintained at all times, from ½ hour before sunrise and ½ hour after sunset as indicated on the Sunrise/Sunset Table at: http://www.sunrisesunset.com/usa/Maine.asp . If the Project town is not listed, the closest town on the list will be used as agreed at the Preconstruction Meeting.

Shoulder closures, lane closures, and lane shifts meeting the MUTCD guidelines, other than those shown in the plans, must be submitted for approval from the MTA prior to use in the construction operations.

No lane closures will be allowed during non-working hours, weekends and/or holiday periods unless included in the Contract as long-term traffic control requirement as outlined in

Section 652 – Specific Project Maintenance of Traffic Requirements **unless written permission is obtained from the Authority.**

Any special signs, barricades or other devices deemed necessary by the Resident shall be furnished and maintained by the Contractor. Extra care shall be taken so that the traffic flow will not be disturbed. The use of construction signs and warning devices not shown on the Plans or in the MUTCD is prohibited unless approved by the Resident

The Contractor's personnel and equipment shall avoid crossing traffic whenever possible. No Contractor's vehicle may slow down or stop in a traffic lane unless said lane has previously been made safe with signs and barricades as required by the Resident.

No vehicle will move onto the traveled way at such a time or in such a manner so as to cause undue concern or danger to traffic approaching from either direction. The Contractor or his employees are not empowered to stop traffic.

The Contractor shall take necessary care at all times, in all operations and use of his equipment, to protect and facilitate traffic. During periods of idleness, the equipment shall not be left in a way to obstruct the traffic artery or to interfere with traffic.

The Contractor shall furnish approved signs reading "Construction Vehicle - Keep Back" to be used on trucks hauling to the Project. The signs shall be a minimum of 30-inch by 60-inch, Black and Orange, and meet construction sign retro reflectivity requirements

All vehicles used on the Project shall be equipped with amber flashing lights, by means of a single or multiple, flashing LED or strobe lights mounted so as to be visible 360 degrees. **In addition, vehicles operating under direction of the Maine Turnpike Authority may be equipped with auxiliary lights that are green, white or amber or any combination of green, white or amber.** Auxiliary lighting shall have sufficient intensity to be visible at 500 feet in normal daylight and a flash rate between 1Hz and 4Hz. The vehicle flashing system shall be in continuous operation while the vehicle is on any part of the project and positioned or mounted in such a way to not be obstructed by vehicle mounted or other equipment. Dump trucks, **concrete trucks** and utility trucks **at a minimum** shall have a strobe light mounted on each side of the vehicle. **The use of motorcycles is not permitted within a construction site or as a means to arrive at or leave a work zone**.

Where space is available pavement striping for all tapers shall create a minimum buffer of 250 feet to the point where the temporary concrete barrier taper ends and becomes parallel to the travelway. Temporary concrete barrier shall be tapered at a minimum 8:1 unless space is available and then it should be tapered at 15:1 or 100 feet whichever is longest.

Milling and paving of interchange ramps shall be done between 9:00 p.m. and 5:00 AM, unless otherwise shown on the Maintenance of Traffic Phasing Plans or as directed by the MTA. Only a single ramp at an interchange may be closed at once. Ramp closures will not be permitted the day before or after holidays, on holidays, or on Saturdays or Sundays. The Contractor shall request approval from the Resident/Authority two weeks prior for all ramp closures. Portable changeable message signs shall be used to provide advance notice and warning of the ramp closure. PCMS's shall be operational a minimum

of 1 week prior to ramp closure to notify Patrons. The contractor shall coordinate PCMS locations with the Resident and the MTA.

Access to, and egress from, the construction area shall be with the direction of travel without crossing traffic. Construction vehicles are prohibited from merging with mainline traffic during the AM and PM peak traffic hours unless approved in writing from the MTA. The contractor shall develop work zone access/egress with acceleration and deacceleration areas and should utilize interchange ramp areas whenever feasible.

Temporary Mainline Lane Closures

A lane closure may be required whenever personnel will be actively working within four feet of a travel lane.

Loading/unloading trucks shall not be closer than six feet from an open travel lane. Temporary lane closures will only be allowed at the times outlined in Special Provision, Section 652, Specific Project Maintenance of Traffic Requirements. These hours may be adjusted based on the traffic volume each day by the Resident.

A lane closure is required when a danger to the traveling public may exist. The following is a partial list of activities requiring lane closures. Lane closures may be required for other activities as well:

- Milling and Paving Operations
- Bridge work
- Drainage Installation and/or Adjustment
- Clear Zone Improvements
- Pavement Markings Layout and Placement
- Work directly over traffic within six feet of a travel lane as measured from the painted pavement marking line or traffic control device will require a lane closure. This work includes but is not limited to the following:

    1. **Unbolting structural steel**
    2. **Removing structural steel**
    3. **Erecting structural steel**
    4. **Erecting or moving sign panels on bridges or sign structures**
    5. **Bolting structural steel**
    6. **Loading and unloading trucks**
    7. **Light pole removal or installation**
    8. **Snow fence installation**

Lane closures shall be removed if work requiring the lane closure is not ongoing unless included in the Contract as a long-term traffic control requirement or approved by the Resident.

During adverse weather condition when the speed limit on the Maine Turnpike has been reduced to 45 MPH, or during fog or when there is less than ½ mile of visibility,

shoulder/lane closures cannot be set up and any currently in place shall be removed. Only work on the turnpike mainline that is behind temporary concrete barrier will be allowed when speed is reduced to 45 MPH or fog/visibility conditions exist.

Daytime lane closures shall be a maximum of three (3) miles. Only one daytime lane closure will be permitted per direction. Nighttime lane closures may extend through the entire length of the Project.

Temporary single lane closures are allowed upon approval of the Resident. **Lane and/or ramp** closure setup may not begin until the beginning time specified. Closures that are setup early or that remain in place outside of the approved time period shall be subject to a lane rental fee of **$1,000** per five minutes for every five minutes outside of the approved time. The installation of the construction signs will be considered setting up the lane closure. Removal of the last construction sign will be considered removal of the closure. Construction signs shall be installed immediately prior to the start of the closure and shall be promptly removed when no longer required. The installation and removal of a closure, including signs, channelizing devices, and arrow boards shall be a continuous operation. The Authority reserves the right to order the removal of an approved closure.

The Authority desires to minimize the number of daytime lane closures and the number of times that a complete stoppage of traffic is required. The Contractor is encouraged to schedule work so that the interference with the flow of traffic will be minimized. Lane closures will not be allowed until traffic associated with complete stoppages of traffic has cleared. Complete stoppages of traffic or lane closures may not be allowed on a particular day if another complete stoppage of traffic has been previously approved for another project.

The Resident is required to receive approval from the Maine Turnpike Authority for all lane closures. **The Resident is required to submit a request for lane closures by noon on Thursday for any lane closures needed for the following week.** The Contractor shall plan the work accordingly.

Temporary Mainline Shoulder Closures

Shoulder closures are anticipated at locations where Contractor access to the mainline is required.

Shoulder closures with plastic drums shall be removed at the end of the workday. Temporary shoulder closures with plastic drums will not be allowed during periods of inclement weather as determined by the Authority.

The location (limits) of shoulder closures with concrete barrier are shown on the Plans. The barrier must be placed prior to the start of the work requiring concrete barrier and shall remain in place until the work activity is complete.

Equipment Moves

The complete stoppage of traffic for an equipment move (including delivery of materials to the median) will be considered for approval if the action cannot reasonably be completed with the erection of a lane closure. Contractor shall be responsible for the installation of Signs CS-3, "Expect Stopped Traffic" and Signs W3-4 "Be Prepared to Stop", in accordance with the Single Lane Closure Detail immediately prior to the equipment move. **Signs will be required on any adjacent ramps within proximity to the stoppage**. These signs shall be covered when not applicable.

State Police will be used to stop traffic. Cost for State Police will be the responsibility of the Authority. The times requested for trooper assisted equipment moves by on-duty troopers cannot be guaranteed. The MTA will not be held responsible for any delays or costs associated with the delay, postponement or cancellation of an on-duty trooper assisted equipment move.

The maximum time for which traffic may be stopped and held for an equipment move across mainline or ramp at any single time shall be five (5) minutes. The duration shall be measured as the time betweenthe time the last car passes the Resident until the time the Resident determines that all travel lanes are clear. The traffic shall only be stopped for the minimum period of time required to complete the approved activity. The Contractor shall reimburse the Authority at a rate of $500 per minute for each minute in excess of the five-minute allowance.

Unapproved movement of equipment or materials across the travel lanes shall be considered a violation of the Maintenance of Traffic Requirements and is subject to a minimum fine of $500 per occurrence with an additional $500 per minute thereafter.

Request for Complete Stoppage of Traffic

A request for a complete stoppage of traffic must be submitted to the Resident for approval. The Resident is required to receive approval from the Maine Turnpike Authority for all stoppages. The request shall be submitted to the Authority by the Resident at least five (5) working days prior to the day of the requested stoppage of traffic and two (2) days for a stoppage less than five minutes. All requests must be received by 12:00 p.m. noon to be considered as received on that day. Requests received after 12:00 p.m. shall be considered as received the following day. The Contractor shall plan the work accordingly.

During the erection or removal of overhead structures or signs traffic shall be stopped and may be held for periods of up to 25 minutes during these operations. Before the roadway is reopened, all materials shall be secured so they will not endanger traffic passing underneath. The Contractor will reimburse the Authority at the rate of $2,500.00 per five-minute period for each roadway not reopened (northbound and southbound), in excess of the 25-minute limit. Total penalty shall be deducted from the next pay estimate.

Blasting of Ledge, The maximum time for which traffic may be stopped at any single time shall be six (6) minutes. This duration shall be measured as the time between the time that the last car passes the Resident, until the time the Resident determines that all travel lanes are cleared of blast debris. The Contractor shall reduce the size of the blast, change the design and method of the blast, use more mats, or otherwise alter the blasting so that the traffic is not stopped for more than six minutes. If, due to the throw of rock onto the highway or other blasting related

activities, traffic is stopped for more than six minutes, the Contractor shall pay a penalty of $1,000.00 per minute for every minute traffic is stopped in excess of the six-minute limit. The penalty shall be measured separately on the northbound and southbound roadway (or eastbound and westbound roadway). Total penalties will be deducted from the next pay estimate. Whenever the volume of traffic is excessive such that a six-minute interruption would cause objectionable congestion, in the opinion of the Authority, the hours during which blasting may occur may be further restricted. A detailed blasting plan shall be submitted as required in Supplemental Specific or Special Provision Sections 105 or 107.

652.3.5 Installation of Traffic Control Devices

All traffic control devices shall be in conformance with NCHRP 350 requirements and MASH 16 requirements if manufactured after December 31, 2019 and installed as per manufactures recommendations.

Portable signs shall be erected on temporary sign supports approved crashworthy devices so that the bottom of the sign is either 1) 12 inches or 2) greater than 5 feet above the traveled way. The bottom of all regulatory signs and ramp exit signs shall be a minimum of 5 feet above the traveled way. The contractor is responsible for maintaining the temporary sign structures so that the sign face remains in a vertical position. Temporary signs supports shall not be used for signs that will remain in place at a single location for more than one month.

No signs on easels shall be placed on 4 foot shoulders with guardrail, signs required at these location shall be placed on taller easels on the median side of the guardrail.

Post-mounted signs shall be erected so the bottom of the sign is no less than 5 feet above the traveled way, and 7 feet above the traveled way in business, commercial, and residential areas. Post-mounted signs must be erected so that the sign face is in a true vertical position. All signs shall be placed so that they are not obstructed in any manner and immediately modified to ensure proper visibility if obstructed.

The bottom of mainline and ramp traffic control signs intending to remain longer than 3 days, except as provided in 2009 MUTCD Section 6F.03 paragraph 12, shall be mounted 5 feet or greater above the edge of pavement on posts or portable sign supports.

The Resident will verify the exact locations of the construction signs in the field.

Construction signs behind guardrail shall be mounted high enough to be visible to traffic.

Vertical panel markers shall be mounted with the top at least 4 feet above the traveled way.

Drums placed along the Turnpike mainline shall have a minimum of one drum weight. Drums that will remain in the same location for more than three days shall have double drum weights. (i.e. a minimum of 40 lbs of drum tire rings). Drums shall not be weighted on the top. Drain holes shall be provided to prevent water from accumulating in the drums During winter periods, drums shall be placed on the grass shoulder or removed from the roadway so winter maintenance operations will not be impacted. This requires the placement of drums behind the median guardrail. Drums shall not be placed on snowbanks.

The Contractor shall operate and maintain the flashing arrow board unit and for dependable service during the life of the contract. The units shall remain in continuous night and day service at locations designated until the Resident designates a new location or discontinuance of service.

The Contractor shall maintain the devices in proper position and clean them as necessary. Maintenance shall include the covering and uncovering of all signs when no longer applicable (even if for a very short duration). The sign shall be considered adequately covered when no part of the sign face is visible either around or through the covering.

The Contractor shall replace damaged traffic control devices with devices of acceptable quality, as directed by the Resident.

The Contractor is required to cover all existing signs, including regulatory and warning signs, within the Work zone which may conflict with the proposed construction signs. The Contractor is also required to cover all permanent construction signs when they conflict with a daily traffic control setup. The method of covering existing signs must be approved by the Resident. The use of adhesives on the sign face is prohibited.

Work Zone Speed Limits

Work Zone Speed (Fines Doubled) is a regulatory speed limit that indicates the maximum legal speed through a work zone which is lower than the normal posted speed. The speed limit shall be displayed by black on white speed limit signs in conjunction with a black on orange "Work Zone" plate. Speed limit signs shall be installed at each mile within the work zone. Any existing regulatory speed limit signs within the reduced speed zone shall be covered once the reduced speed signs have been erected.

Two orange fluorescent flags shall be attached to all speed limit signs that are uncovered for a period of time exceeding one week. This work shall be incidental. Signs that are covered and uncovered on a regular basis are not required to have the supplemental flags.

The reduced speed limit signs shall be used when workers are adjacent to traffic, when travel lane(s) are closed, when indicated on Maintenance of Traffic Control Plans provided or other times as approved by the Resident:

The signs shall be covered or removed when not applicable. The covering and uncovering of signs shall be included for payment under Maintenance of Traffic. Signs relating to reduced speed shall be installed in accordance with the details. The Contractor shall note that all signs including those behind concrete barrier or guardrail are required to be clearly visible to all drivers at all times.

Lane Closure Installation and Removal Procedure

The Contractor will follow the following procedures when closing any travel lanes on the turnpike roadways:

1. The sign package shall be erected starting with the first sign and proceeding to the start of the taper. The sign crew shall erect signs with the vehicle within the outside shoulder.

2. Position the arrow board with the proper arrow at the beginning of the taper; and,

3. When arrow board is in place, continue with the drums/cones to secure the work area.

To dismantle the lane closure, start with last drums/cone placed and work in reverse order until all the drums are removed. The arrow board which was installed first shall be the final traffic control device removed, excluding the sign package. The remaining sign package shall be picked-up starting with the first sign placed and continuing in the direction of traffic and with the vehicle in the outside shoulder.

Trucking Plan

The Contractor shall submit a trucking plan to the Resident within 10 working days of the award of the Contract. The trucking plan shall consist of at least the following:

- Date of anticipated start of work per each location.
- Haul routes from plant/pit to work area and return.
- Haul routes from work area to disposal area and return.
- Entering / exiting the work area.
- Vehicle safety equipment and Vehicle inspection.
- Personal safety equipment.
- Communications equipment and plan.

The trucking plan will not be paid for separately but shall be incidental to the Contract.

652.3.6 Traffic Control

The existing travel way width shall be maintained to the maximum extent practical.

Vertical panel markers, drums, cones, or striping shall be used to clearly delineate the roadway through the construction area. Two-way traffic operation shall be provided at all times that the Contractor is not working on the project. One- way traffic shall be controlled through work areas by flaggers, utilizing radios, field telephones, or other means of direct communication.

The traffic control devices shall be moved or removed as the work progresses to assure compatibility between the uses of the traffic control devices and the traffic flow.

Pavement markings shall be altered as required to conform to the existing traffic flow pattern. Repainting of pavement marking lines, if required to maintain the effectiveness of the line, shall be considered **incidental to the** maintenance of traffic control devices, no separate payment will be made. Inappropriate pavement markings shall be removed whenever traffic is rerouted, and temporary construction pavement markings shall be placed. Removal of non-applicable markings and **initial** placement of temporary construction pavement markings will be paid for under the appropriate Contract items. Traffic changes shall not be made unless there is sufficient time, equipment, materials, and personnel available to complete the change properly before the end of the workday. This provision will not be required when traffic is rerouted for brief periods and the route can be clearly defined by channelizing devices, or flaggers, or both.

All vehicles used during the installation and removal of traffic control devices, including lane closures, shall be equipped with a vehicle-mounted lighted arrow board **or high intensity LED full width light bar** acceptable to the Resident. The arrow board **or full width light bar** shall be capable of displaying a left arrow, right arrow, double arrow, and light bar **patterns**.

652.4 Flaggers

The Contractor shall furnish flaggers as required by contract documents or as otherwise specified by the Resident. **Flaggers shall not stop traffic on Turnpike mainline or interchange ramps. Only State Police are allowed to stop traffic on mainline or interchange ramps.**

All flaggers must have successfully completed a flagger test approved by the Maine Department of Transportation and administered by a Maine Department of Transportation approved Flagger-Certifier. All flaggers must carry an official certification card with them at all times while flagging.

For daytime conditions, flaggers shall wear a top (vest, shirt or jacket) that is orange, yellow, yellow-green, or fluorescent versions of these colors meeting ANSI 107-2004, Class 3, along with a hat with 360 ˚ retro-reflectivity.

For nighttime conditions, flaggers shall wear all Class 3 apparel, meeting ANSI 107-2004, including a Class 3 top (vest, shirt or jacket) and a Class E bottom (pants or coveralls), shall be worn along with a hardhat with 360 ˚ retro-reflectivity and shall be visible at a minimum distance of 1000 ft. Flagger stations must be illuminated in nighttime conditions to assure visibility and will be specifically addressed in detail in the Contractor's TCP.

Flagger stations shall be located far enough in advance of the workspace so that approaching road users will have sufficient distance to stop at the intended stopping point. While flagging, the flagger should stand either on the shoulder adjacent to the traffic being controlled, or in the closed lane. At a spot obstruction with adequate sight distance, the flagger may stand on the shoulder opposite the closed sections to operate effectively. Under no circumstances shall the flagger stand in the lane being used by moving traffic or have their back to oncoming traffic. The flagger should be clearly visible to approaching traffic at all times and should have a clear escape route.

When conditions do not allow for proper approach sight distance of a flagger or storage space for waiting vehicles, additional flaggers shall be used at the rear of the backlogged traffic or at a point where approaching vehicles have adequate stopping sight distance to the rear of the backlogged traffic. All flagger stations shall be signed, even when in close proximity. The signs shall be removed or covered when flagger operations are not in place, even if it is for a very short duration.

Flaggers shall be provided as a minimum, a 10-minute break, every 2 hours and a 30 minute or longer lunch period away from the workstation. Flaggers may only receive 1 unpaid break per day; all other breaks must be paid. Sufficient certified flaggers shall be available onsite to provide for continuous flagging operations during break periods. If the flaggers are receiving the appropriate breaks, breaker flagger(s) shall be paid starting 2 hours after the work begins and ending 2 hours before the work ends. A maximum of 1 breaker per 6 flaggers will be paid. (1 breaker flagger for 2 to 6 flaggers, 2 breaker flaggers for 7 to 12 flaggers, etc.). If a flagger station is manned for 10 hours or more, then ½ hour for lunch will be deducted from billable breaker flagger hours.

652.41 Traffic Officers

Local road traffic officers, if required, shall be uniformed police officers. State Police officers and vehicles shall be used to warn and stop traffic on the Maine Turnpike. All State Police shall be scheduled through the Maine Turnpike Authority. The Authority will make payment for the State Police officers and vehicles directly to the State Police.

The Contractor will not be entitled to additional compensation if scheduled Work is not completed due to the unavailability of State Police.

652.5.1 Rumble Strip Crossing

When lane shifts or lane closures require traffic to cross a permanent longitudinal rumble strip for 7 calendar days or less, the Contractor shall install warning signs that read “RUMBLE STRIP CROSSING” with a supplemental Motorcycle Plaque, (W8-15P).

When lane shifts or lane closures require traffic to cross a permanent longitudinal rumble strip for more than 7 calendar days, the Contractor shall pave in the rumble strips in the area that traffic will cross, unless otherwise directed by the Resident. Rumble strips shall be replaced prior to the end of the project, when it is no longer necessary to cross them.

652.6.1 Daylight Work Times

Unless otherwise described in the Contract, the Contractor is allowed to commence work and end work daily according to the Sunrise/Sunset Table at: http://www.sunrisesunset.com/usa/Maine.asp . If the Project town is not listed, the closest town on the list will be used as agreed at the Preconstruction Meeting. Any work conducted before sunrise or after sunset will be considered Night Work.

652.6.2 Night work

When Night Work occurs (either scheduled or unscheduled), the Contractor shall provide and maintain lighting on all equipment, at all workstations, and all flagger stations.

The lighting facilities shall be capable of providing light of sufficient intensity to permit good workmanship, safety, and proper inspection at all times. The lighting shall be cut off and arranged on stanchions at a height that will provide perimeter lighting for each piece of equipment and will not interfere with traffic, including commercial vehicles, approaching the work site from either direction.

The Contractor shall have available portable floodlights for special areas.

The Contractor shall utilize padding, shielding or other insulation of mechanical and electrical equipment, if necessary, to minimize noise, and shall provide sufficient fuel, spare lamps, generators, etc. to maintain lighting of the work site.

The Contractor shall submit a lighting plan prior to any night work for review showing the type and location of lights to be used for night work. The Resident may require modifications be made to the lighting set up in actual field conditions.

Prior to beginning any Night Work, the Contractor shall furnish a light meter for the Residents use that is capable of measuring the range of light levels from 5 to 20 foot-candles.

Horizontal illumination, for activities on the ground, shall be measured with the photometer parallel to the road surface. For purposes of roadway lighting, the photometer is placed on the pavement. Vertical illumination, for overhead activities, shall be measured with the photometer perpendicular to the road surface. Measurements shall be taken at the height and location of the overhead activity.

Night Work lighting requirements:

Mobile Operations: For mobile-type operations, each piece of equipment (paver, roller, milling machine, etc.) will carry indirect (i.e. balloon type) lights capable of producing at least 10 foot- candles of lighting around the work area of the equipment.

Fixed Operations: For fixed-type operations (flaggers, curb, bridge, pipes, etc.), direct (i.e. tower) lighting will be utilized capable of illuminating the work area with at least 10 foot- candles of light.

Hybrid Operations: For hybrid-type operations (guardrail, sweeping, In-slope excavation, etc.), either direct or indirect lighting may be utilized. The chosen lights must be capable of producing at least 10 foot-candles of light around the work area of the equipment

Inspection Operations: Areas required to be inspected by the Authority will require a minimum of 5 foot-candles of lighting. This may be accomplished through direct or indirect means.

The Contractor shall apply 2- inch wide retro-reflective tape, with alternating red and white segments, to outline the front back and sides of construction vehicles and equipment, to define

their shape and size to the extent practicable. Pickup trucks and personal vehicles are exempt from this requirement.

The Resident or any other representative of the Authority reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Authority shall not be held responsible for any delay in the work due to any suspension under this item.

Failure to follow the approved Lighting Plan will result in a Traffic Control violation.

Payment for lighting, vehicle mounted signs and other costs accrued because of night work will not be made directly but will be considered incidental to the related contract items.

652.6.3 Traffic Coordinator and Personnel

The Contractor shall submit to the Resident for approval a list of traffic control personnel assigned to the Project including qualifications, certifications and experience.

The Traffic Coordinator duties shall include, but are not necessarily limited to:

a. Developing, in conjunction with the Resident and Project superintendent, a traffic control program for the days' work activities which will facilitate traffic in a safe and efficient manner.

b. Ensure that all traffic control implements (signs, arrow boards, barrels, etc.) are on-site so the traffic program can be implemented effectively.

c. Ensure a safe and effective setup or take-down of all signing implements to least impact the traveling motorist; and,

d. Working knowledge of construction signing/traffic control requirements in conformance with the latest issued Manual on Uniform Traffic Control Devices.

e. The Contractor shall supplement the traffic control plan with a daily plan, which includes schedules for utilizing traffic coordinators and flaggers. This plan shall be submitted daily and agreed upon cooperatively with the Resident.

652.7 Method of Measurement

Signs, signs supplied by the Authority, and panel markers will be measured by the square foot for all signs authorized and installed. Flashing arrow boards, portable-changeable message signs, and flashing and steady burn lights, will be measured by each unit authorized and installed on the project. Barricades and cones will be measured by each unit authorized. Drums will be measured by each or as a lump sum authorized and installed, as indicated on the plans and specifications. No additional payment will be made for devices that require replacement due to poor condition or inadequate retroreflectivity.

Flaggers or traffic officers used during the Contract, for the convenience of the Contractor, will not be measured separately for payment, but shall be incidental to the various

pay items. **This includes use of Flaggers for the delivery of materials and equipment to the project or other Flagger use that is for the Contractor's convenience, as determined by the Resident Engineer. If flaggers are required to maintain traffic and there is not a pay item in the contractor for flaggers, then flaggers shall be incidental to the other Section 652 contract items and no separate payment shall be made.**

The accepted quantity of traffic officer and flagger time will be the number of hours the designated station is occupied. The number of hours authorized for payment, **if any**, will be measured to the nearest ¼ hour.

The Authority will make payment for the State Police officers and vehicles directly to the State Police when utilized for mainline traffic control activities. State Police escorts, if required to move oversize material or equipment loads to the jobsite, will not be paid separately, but shall be incidental to the various pay items.

Maintenance of traffic control devices, including Truck mounted impact attenuators and Automated trailer mounted speed limit signs required for the project will be measured by the calendar day or as one lump sum, as indicated in the plans and specifications, for all authorized and installed traffic control devices. Traffic control devices will only be measured for payment the first time used. Subsequent uses shall be incidental to Item 652.36 or 652.361.

The vehicle mounted arrow board, mounted on trucks used for installation and removal of lane closures, will not be measured separately for payment, but shall be incidental to Item 652.36 or 652.361.

The traffic coordinator(s) will not be measured separately for payment but shall be incidental to Item 652.36 or 652.361.

Portable light towers, lighting on equipment and lighting plan will not be measured separately for payment but shall be incidental to the related Contract items.

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Sequential Flashing Warning Lights shall be measured for payment by the maximum number of sequential flashing warning lights satisfactorily installed and properly functioning at any one time during the life of the project. Payment shall include all materials and labor to install, maintain and remove all Sequential Flashing Warning Lights.

Automated Trailer Mounted Speed Limit Sign shall incidental to the Maintenance of Traffic Control device item Payment shall include the Trailer, Radar Speed Limit Sign, flashing beacon amber lights, regulatory speed limit sign, fuel, necessary maintenance, and all checking of Radar Speed Limit Signs by manufacturer and all project moves including the transporting and delivery of the unit.

The accepted quantity of temporary portable rumble strips shall be measured by the unit complete in place, per lane closure application. A unit shall consist of 1 group of 3 full-lane width of rumble strips. As shown in the plans, a maximum of 3 units may be used at each lane closure. A unit shall be measured for each group of rumble strips, each time they are used for a lane closure.

652.8 Basis of Payment

The accepted quantity of signs, signs supplied by the Authority, and panel markers will be paid for at the contract unit price per square foot. Such payment will be full compensation for furnishing (or retrieving from the Authority) and installing all signs, sign supports, and all incidentals necessary to complete the installation of the signs.

The accepted quantity of flashing arrow boards, barricades, battery operated flashing and steady burn lights, and cones will be paid for at the contract unit price each for the actual number of devices authorized, furnished, and installed. Such payment shall be full compensation for all incidentals necessary to install and maintain the respective devices.

The Sequential Flashing Warning Lights will be paid for at the Contract unit price per each. This price shall include all costs associated with furnishing, installing, operating, maintaining, relocating, and removing the Sequential Flashing Warning Lights.

The Truck Mounted Attenuator(s) will be incidental to the Maintenance of Traffic Control device item . This price shall include all costs associated with the use of the vehicle. Payment shall include operator, fuel, truck, maintenance, flashing lights, arrow board and all other incidentals necessary to operate the vehicle.

Failure by the contractor to reinstall cones, barrels, signs, covered/uncovered signs, and similar traffic control devices within an hour of them being displaced, moved, knocked over, un-covered and etc. will result in a $150 fine per traffic control device if the issues is not resolved within 1 hour of notification by the resident. An additional $150 will be assessed for each additional hour that the device has not been corrected. If the traffic control device is critical to the maintenance of traffic creating an actual or potential safety issue with traffic and is not corrected immediately then it will result in a violation letter as described below.

Failure by the contractor to follow the Contracts 652 Supplemental Specifications, Special Provisions and Standard Specification and/or the Manual on Uniform Traffic Control Devices (MUTCD) and/or the Contractors own Traffic Control Plan, or failure to correct a violation, will result in a violation letter and result in a reduction in payment as shown in the schedule below. The Resident or any other representative of the Authority reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Authority shall not be held responsible for any delay in the work due to any suspension under this item. Any reduction in payment under this Special Provision will be in addition to forfeiting payment of maintenance of traffic control devices for that day.

Amount of Penalty Damages per Violation		
1st	2nd	3rd & Subsequent
$500	$1,000	$2,500

652.8.1 Maintenance of Traffic Control Devices

Maintenance of Traffic Control Devices will be paid at the contract unit price per calendar day or lump sum price, as indicated in the plans and specifications. Such payment will be full compensation for all days that the Contractor maintains traffic as specified herein, and for moving

devices as many times as necessary; for replacing devices damaged, lost, or stolen; and for cleaning, maintaining, and removing all devices used for traffic control, including replacing temporary pavement marking lines.

The contract price for Maintenance of Traffic Control Devices shall be full compensation for all days for such maintenance, encompassing all areas of the contract, regardless of whether or not the work areas or projects are geographically separated.

652.8.2 Other Items

The accepted quantities of flagger hours will be paid for at the contract unit price per hour for each flagging station occupied excluding lunch breaks, and for each approved breaker flagger. Overtime hours, as reported on the certified payrolls, will be paid an additional 30% of the bid price for 652.38. The computation and additional payment for overtime hours will occur during the project close-out process and will be paid as additional hours of 652.38 to the nearest ¼ hour. The contract unit price shall be full compensation for hiring, transporting, equipping, supervising, and the payment of flaggers and all overhead and incidentals necessary to complete the work.

There will be no payment made under any 652 pay items after the expiration of the adjusted total contract time.

The accepted quantities of traffic officer hours will be paid for at the contract unit price per ¼ hour for each station occupied, with no additional payment for overtime. This price shall be full compensation for supplying uniformed officers with police cruisers, and all incidentals necessary to complete the work, including transportation, equipment, and supervision.

Payment for temporary pavement marking lines and pavement marking removal will be made under the respective pay item in Section 627 - Pavement Markings.

Payment for temporary traffic signals will be made under Section 643 - Traffic Signals.

The accepted quantity of Portable Changeable Message Signs will be paid for at the Contract unit price each. This price shall be full compensation for furnishing, relocating, maintaining and removing the PCMS. The price also includes all costs associated with setting-up and paying for a data cellular account, technical support, training and any costs associated with the GPS location device.

Progress payment of each PCMS shall be pro-rated over the duration of the Contract. Contract duration shall be from the specified Contract start date to substantial completion or Contract completion, whichever is sooner.

For a PCMS that fails to operate when required, the Contractor will be given 24-hours to repair or replace the PCMS. For periods longer than 24-hours, payment will be reduced based on the pro-rated time that the PCMS is out of service.

Drums will be paid for at the contract unit price each, or at the Contract lump sum price, as designated in the Plans and specifications. Such payment shall be full compensation for all drums as shown on the Plans or required to complete the work.

The accepted quantity of temporary portable rumble strips will be paid for at the contract unit price per unit which shall include the transport device. Payment is full compensation for providing, relocating, maintaining or replacing, and removing temporary portable rumble strips. If the pay item is not included in the contract quantities, then the Authority does not anticipate the use of this item on the contract. If contractor wishes to utilize temporary portable rumble strips and the item is not in the contract, then the contractor may propose use of them to the Authority for consideration.

Payment will be made under:

Pay Item		Pay Unit
652.30	Flashing Arrow Board	Each
652.31	Type I Barricade	Each
652.311	Type II Barricade	Each
652.312	Type III Barricades	Each
652.32	Battery Operated Light	Each
652.33	Drum	Each
652.331	Drum	Lump Sum
652.34	Cone	Each
652.35	Construction Signs	Square Foot
652.351	Construction Signs-Supplied by Authority	Square Foot
652.36	Maintenance of Traffic Control Devices	Calendar Day
652.361	Maintenance of Traffic Control Devices	Lump Sum
652.38	Flaggers	Hour
652.381	Traffic Officers	Hour
652.41	Portable-Changeable Message Sign	Each
652.46	Temporary Portable Rumble Strips	Unit
652.47	Sequential Flashing Warning Lights	Each

SECTION 719

SIGNING MATERIAL

Section 719.01 Reflective Sheeting

This Subsection is deleted in its entirety and replaced with the following:

Retroreflective sheeting for signs shall meet at a minimum the requirements for ASTM 4956 – Type XI (Prismatic) manufactured by 3M Company, for all signs.

Reflective sheeting, used in sign construction, shall have been manufactured within the six months immediately prior to the fabrication of each sign. Upon delivery at the job site of each shipment of signs, a letter of certification shall be provided that the reflective sheeting conforms to the requirements.

For Type 1 Guide Signs, all reflective sheeting shall be color matched on each sign unit.

All warning signs shall be fluorescent yellow except for Ramp Advisory Speed signs which shall be yellow.

All Construction Series signs that use orange backgrounds shall be fluorescent orange.

All Pedestrian Signs shall be fluorescent yellow-green.

EZ-PASS Purple shall conform to the FHWA Purple color box.

719.02 Demountable High Intensity Reflectorized Letters, Numerals, Symbols, and Borders

This Subsection, including the title, is deleted in its entirety and replaced with the following:

719.02 Letters, Numerals, Symbols, and Borders

All signs shall be manufactured utilizing Direct Applied letters, numerals, symbols and borders or be Digitally Printed meeting all sign sheeting manufacturer's (3M) requirements to ensure that the manufacturer's warranty will be in full effect.

All Type 1 overhead signs, Type 1 interchange signs and any other Type 1 signs over 100 square feet shall utilize Direct Applied letters, numerals, symbols and borders.

Direct Applied

Direct reflectorized applied letters, numerals, symbols and borders shall consist of cut out sheeting that shall meet at a minimum the requirements for ASTM 4956 – Type XI (Prismatic) sheeting. The sheeting material used for the direct applied legend shall be the same type as used for the background.

Digitally Printed

Digital printing methods may be used to produce the sign copy and borders on retroreflective sheeting. Retroreflective sheeting complying with ASTM D 4956 Type XI and designated by the manufacturer as suitable for digital printing traffic signs along with associated ink and premium overlay film. Digitally Printed signs shall meet all sign sheeting manufacturer's (3M) requirements to ensure that the manufacturer's warranty will be in full effect

Transparent and opaque durable inks used in digital printed sign copy and borders shall be as recommended by the sheeting manufacturer (3M). Digital printed traffic colors shall be properly applied and shall have a warranty life of the base retroreflective sign sheeting. Digitally printed signs shall present a flat surface, free from foreign material, and all copy and borders shall be clear and sharp. Digital printed signs shall conform to 70% of the retroreflective minimum values established for its type and color (applicable to traffic colors only), as required by ASTM D 4956. Digital printed signs shall meet the daytime color and luminance, and nighttime color requirements of ASTM D 4956. Printed traffic colors shall meet the accelerated weathering and colorfastness requirements of ASTM D 4956. Digitally printed black shall remain sufficiently opaque for its intended use for the warranty period of the base sheeting. No variations in color or overlapping of colors will be permitted.

Digitally printed traffic signs shall have an integrated engineered match component clear UV- premium protective overlay recommended by the sheeting manufacturer applied to the entire face of the sign.

All digitally printed traffic signs shall utilize an integrated engineered match component system for materials and printing process and equipment. The integrated engineered match component system shall consist of retroreflective sheeting, durable ink(s), and clear protective overlay film, as specified by the sheeting manufacturer, applied to aluminum substrate.

The sign fabricator shall use an integrated engineered match component system digital printer approved by the sheeting manufacturer. Each approved digital printer shall only use the compatible retroreflective sign sheeting manufacturer's engineered match component system products. The sign fabricator shall maintain their digital printer's color calibration according to the sheeting manufacturer's requirements to help ensure digitally printed signs meet the manufacturer's specifications. The fabricator shall be trained by the sheeting manufacturer to produce digitally printed traffic signs that qualify for the sheeting manufacturer's warranty.

General

Type 1 Guide Signs shall have two-inch-tall, series C text that indicates the sign size, and the sign install date (MM/YY) located two inches above the bottom border of the sign.

DIVISION 800 – FUEL SYSTEMS

SPECIAL PROVISION

SECTION 801

FUEL SYSTEM DEMOLITION

801.01 Description

The Contractor shall furnish all labor, material, tools, transportation and equipment necessary to remove and dispose of the existing Fuel System, Underground Storage Tanks (UST)s, associated electrical, structural, and product equipment, (e.g., dead men, anchor straps, product piping, manways, vent piping, pumps, and dispenser(s)). The existing Veeder Root TLS-450 Plus monitoring console will remain and be reconnected to the new fueling systems. This section specifies requirements for the environmental and tank assessment, permitting, removal and disposal of the UST(s) and is intended to supplement the construction/installation specifications.

801.02 General

Generally, the work shall include, but not be limited to:

A. Removal of tanks and facilities must be conducted in accordance with API Recommended Practice 1604 and Rules for Underground Oil Storage Facilities, 06-096 CMR 691, Appendix J to the satisfaction of the Maine DEP.

B. Contractor to submit the Maine DEP "Notice of Intent to Remove an Underground Oil Storage Tank Facility or Underground Product Piping" Form at least 10 days prior to commencement of removal work. The form must be submitted to Maine DEP, the local fire department, Certified Underground Oil Storage Tank Installer, and Site Assessor.

C. Excavated soils will be classified by Maine Turnpike's Environmental Consultant based on their visual and olfactory evidence of contamination and by accepted field screening. Field screening shall be performed according to the MaineDEP Appendix Q of 06-096, Chapter 691 Rule for Underground Oil Storage Facilities See Special Provision 203 Excavation and Embankment (Contaminated Soil and Groundwater Management) for more details.

D. The facility owner shall ensure that no permanent structures, underground utilities, or other objects are installed or constructed in proximity to the tank if such structures, utilities or other objects will impede safe removal of the tank as determined by a Maine Certified Underground Oil Storage Tank Installer or a Maine registered engineer.

E. After the tank or piping is removed, contractor to complete the "Removal Confirmation Notice" and coordinate submittal to the Maine DEP.

F. The Certified Underground Oil Storage Tank Installer overseeing a tank removal must be trained in best management practices for erosion and sedimentation control by the Maine DEP or through an equivalent program approved by the Maine DEP.

801.03 Safety Requirements

A. All work performed under this contract shall comply with Occupational Safety and Health Administration (OSHA) requirements in 29 CFR 1910 and 29 CFR 1926, especially OSHA Standards 29 CFR 1926.65 and 29 CFR 1910.120. Matters of interpretation of standards shall be submitted to the Owner's representative (Resident) for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

B. Contractor to provide appropriate protective equipment for all personnel working in direct contact with vapors, liquids or sludge removed from the tanks. All personnel shall be trained in the proper use and maintenance of the appropriate protective equipment used on this project. Smoking will not be allowed in the work area or loading area during the course of the work.

C. Personnel working inside and in the general vicinity of the tanks shall be trained and thoroughly familiar with the safety precautions, procedures, and equipment required for controlling the potential hazards associated with this work, including training for confined space entry. Personnel shall use proper protection and safety equipment during work in and around the tanks, including instruments to monitor air quality, explosive atmospheres and oxygen content.

D. Warning signs and devices shall be placed at regular intervals along the work area perimeter, and establish restricted work zones, support areas and decontamination areas as needed. Contractor shall furnish, install and maintain fencing or other appropriate barricades at open excavations, including illumination if left over night.

E. Prior to ending operations on any working day or at any time the Contractor is not on site, the Contractor shall secure all areas of work by erecting temporary safety fencing.

F. Cutting of steel or other metals by thermal methods shall, at all times, occur in a non-explosive environment. During such work, percent of lower explosive limit in the tanks, piping of the surrounding atmosphere shall be continuously monitored. The Contractor shall note that residual pockets of oils or residues may exist in some of the pipelines and the Contractor shall exercise care to prevent release to the environment and harm to workers, facility staff or the public resulting from potential explosive nature of the contained materials.

G. The Contractor shall provide and maintain an adequate supply of fire extinguishers and other required safety equipment in close proximity to all tank cleaning and removal activities.

801.04 Materials

Contractor shall provide all materials required for the safe and efficient removal of the fuel system.

801.05 Construction Requirements

The Contractor shall carry out the work generally in accordance with the phasing and notes provided in the plans. The contractor shall develop a proposed construction schedule as noted in Special Provision 107.4.6 Prosecution of Work; including any proposed modifications to the plan notes.

PRODUCT REMOVAL

A. The Contractor shall use appropriate techniques to remove residual petroleum product from the USTs. Residual fuels shall become the property of the Contractor, and may be re-used, recycled, or disposed in any legal manner.

PURGE AND REMOVE PRODUCT AND VENT PIPING

A. The Contractor shall drain and flush all supply piping back into the tanks before cleaning. A suitable solvent solution, preferably the same as the tank cleaning solvent, shall be used to render the piping runs clean.

B. Piping and vent runs shall then be exposed, cut, and removed. The piping exterior and ancillary equipment shall be cleaned to remove all soil and inspected for signs of corrosion and leakage. All fuel system supply, return, and vent piping that is accessible from the exterior ground surface shall be entirely removed.

C. Concrete or asphalt pavement shall be saw cut at the limits of removal, broken, and removed with the resulting debris disposed at a suitable location.

CUT AND CLEAN TANKS

A. After the tank and piping contents have been removed, but prior to excavation beyond the top of the tank, the Contractor shall disconnect all the piping (except the piping needed to purge or inert the tank). Flammable and toxic vapors shall be purged from the tank or the tank made inert in accordance with API RP 1604, with the exceptions that filling with water shall not be used and, if dry ice is employed, the Contractor shall use a minimum of 3 pounds per 100 gallons of tank volume. The tank atmosphere shall be continuously monitored for combustible vapors if the tank is purged, or continuously monitored for oxygen if the tank is made inert.

B. Cleaning shall be done using specially designed tank cleaning equipment that allows the tank to be thoroughly cleaned. If entry is necessary, the tank(s) shall be rendered safe for entry in accordance with industry standard practices, the guidance documents cited herein, and all applicable safety and health regulations. The tank must be cleaned in place and inspected. The tank shall be removal from the ground. The Contractor must clean each tank and render each tank gas-free prior to transporting and/or inspection.

C. The tank interior shall be cleaned using a high pressure (greater than 500 psi), low volume (less than 2 gpm) water spray until all loose scale and sludge is removed, and contamination, in the form of a sheen, is no longer visible in the effluent stream.

D. All residual liquids, sludge, and other materials shall be removed from the tanks, placed into appropriate containers, and transported for disposal in accordance with applicable regulations. The Contractor shall discuss the proposed disposal facility and treatment plan with the Owner’s representative prior to transporting wastes from the site.

EXCAVATE AND REMOVE TANK

A. The Contractor shall excavate and remove each tank from the ground, using caution to prevent damaging the tanks with digging or lifting equipment so that the tank can be inspected upon removal from the ground. Upon removal from the excavation, the tank exteriors shall be cleaned to remove all soil and inspected for signs of corrosion, structural damage, or leakage. The tanks may be loaded directly onto a transport vehicle. If the tanks are placed on the ground, they shall be set on high-density polyethylene (HDPE) sheeting and chocked to prevent rolling.

B. Exploratory trenches shall be excavated as necessary to determine the tank location, limits, and the location of ancillary equipment. Excavation around the perimeter of the tank shall be performed in such a manner as to limit the amount of potentially petroleum contaminated soil that could be mixed with uncontaminated soil. Petroleum contaminated soil shall be segregated in separate stockpiles. The stockpile location shall be approved by the Owner's representative in advance of soil placement. The Contractor shall maintain around the tank an excavation of sufficient size to allow workers ample room to complete the work, but also protect the workers from sliding or cave-ins. Sheeting, bracing, or shoring shall be installed in the absence of adequate side slopes if there is a need for workers to enter the excavated area. Surface water shall be diverted to prevent direct entry into the excavation.

C. Dewatering of the excavation, if necessary, shall be limited to allow adequate access to the tank and piping, to assure a safe excavation, and to ensure that compaction and moisture requirements are met during backfilling. Discharge of water will require a discharge permit from the EPA and/or the Maine DEP and shall not proceed until the Owner's representative has reviewed these permits. Dewatering may result in the production of petroleum contaminated water and/or free product. Free product shall be recovered from the groundwater only as part of necessary dewatering.

D. Open excavations and stockpile areas shall be secured while awaiting confirmation test results from the soil beneath the tank. Excavations shall be backfilled as soon as possible after the tank and contaminated soil removals have been completed and confirmation samples have been collected. The Contractor shall divert surface water around excavations to prevent water from directly entering the excavation.

OVER-EXCAVATION (AS NECESSARY)

A. Upon direction from the Owner's representative, the Contractor shall excavate contaminated soil. Though this contract is not a remedial action, some limited amount of excavation may allow rapid assessment and closure of the site without requiring a separate mobilization and will be performed under this contract.

B. Excavated contaminated soil shall be placed on and covered by HDPE sheeting that is secured against wind and rain. The Owner's representative must characterize the soil for disposal and provide documentation of such prior to transporting any soil from the site. The Contractor shall then load the soil into trucks coordinated and provided by the Owner's representative. See Special Provision 203 Excavation and Embankment (Contaminated Soil and Groundwater Management) for details.

BACKFILL & SITE RESTORATION

A. Backfill material shall be obtained from a clean offsite source, and shall be classified in accordance with ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, and shall be free from roots and other organic matter, trash, debris, snow, ice, and other deleterious materials. Non-contaminated material removed from the tank excavation may be used for backfill.

B. Backfill shall be placed in lifts and compacted to 90% maximum Proctor Density in areas that will not be re-paved. For areas underlying asphalt pavement, lifts shall be compacted to 95% maximum Proctor Density. Suitable base course material shall be placed at a thickness of 12 inches as the final lift or as detailed on the Typical Sections and as directed by the Resident. For areas beneath new concrete slabs, compaction and base course requirements are as depicted on the design drawings.

WASTE DISPOSAL

A. All wastes generated during UST cleaning and removal shall be properly packaged and transported from the site. Meeting all regulatory requirements, including the preparation of materials and waste for transportation and preparation of accompanying paperwork (manifests and Bills of Lading) shall be the responsibility of the Contractor.

B. Temporary storage on the project site will be allowed only until testing is complete, manifests (if necessary) are complete, and transportation is arranged. The Contractor shall provide approved containers, vehicles, equipment, labor, signs, labels, placards and manifests and associated land disposal restriction notices and notifications, necessary for accomplishment of the work, including materials necessary for cleaning up spills that could occur from tank removal operations.

C. Transportation shall be provided in accordance with Department of Transportation (DOT) Hazardous Material Regulations and state and local requirements, including obtaining all necessary permits, licenses, and approvals.

D. The Contractor shall retain the rights to salvage value of recycled or reclaimed product and metal, so long as all state and federal waste disposal requirements are met. At the end of the contract, the Contractor shall provide documentation on the disposition of salvaged materials.

SPILLS

A. Immediate containment actions shall be taken as necessary to minimize the effects of any spill or leak. Cleanup shall be in accordance with applicable federal, state, local laws and regulations at no additional cost to the Owner.

801.06 Methods of Measurement

Removal of existing Underground Fuel Storage Tanks (Gasoline and Diesel) will be measured as one lump sum, but not limited to: removal of existing underground storage tanks, fuel draining, tank and line cleaning and all incidentals necessary to remove the tanks and appurtenances completely.

801.07 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
801.10	Removal of Existing Fuel System (Underground Tanks, Gasoline and Diesel Systems)	Lump Sum

SPECIAL PROVISION

SECTION 802
ABOVEGROUND FUEL STORAGE TANK SYSTEMS (TEMPORARY)

802.01 Description

This work shall consist of furnishing and installing materials and components for two above ground storage tank (AST) systems for the temporary fueling required at the service plaza during the construction of the permanent fuel storage systems. These temporary fueling systems shall consist of a 10,000-gallon AST with 4 dispensers for gasoline fueling and a 2,000-gallon AST with 2 dispensers for commercial diesel fueling as detailed in the drawings and these specifications.

802.02 General

Generally, the work shall include, but not be limited to:

A. Contractor shall coordinate the rental of two Temporary AST fuel systems with a tank rental company (Berco Tank, On-Demand Fuel Tank Rental, or approved equal).

B. Contractor shall design, furnish, assemble, and install these temporary fueling systems in conformance with the drawings. Contractor to furnish and install dispenser pedestal and mounting hardware as required to mount dispensers to the tank ends as shown on the drawings and in accordance with NFPA 30 and NFPA 30A. Contractor to coordinate with CN Brown for Wayne ovation dispensers to be supplied by CN Brown.

C. Contractor to submit shop drawing for each temporary fueling system for approval by Owner's representative and coordinate submittal to the State Fire Marshall for approval of the temporary AST systems.

D. Contractor shall coordinate with the Resident for the final delivery date of the Aboveground Fuel Tanks and Fuel Dispensers for these Temporary Fuel Systems. In addition, Contractor is responsible for crane and off-loading tank, bearing pad for the temporary tanks, and providing proper temporary electrical and communication service to the Temporary Fuel System Kiosk, including emergency control/disconnects. All wire runs shall be overhead and meet all applicable National and State Codes.

E. Contractor shall coordinate with the Resident and Owner's fuel vendor (CN Brown) for delivery of a temporary kiosk to be located generally between the temporary gas and diesel tanks as shown on the drawings.

F. Contractor to install the Aboveground Fuel Tanks and Fuel Dispensers for Temporary Fuel Systems, test, and commission them prior to demolition of the existing fueling systems.

G. Contractor shall provide Resident and Owner's representative (CN Brown) with 10 days notice for the Aboveground Fuel System installation, then coordinate with the Owner's representative (CN Brown) for the Point-of-Sale connections, emergency control/disconnects, and all final testing.

H. Contractor shall provide certified staff for testing and commissioning and shall provide Owner with required information for tank registration with Maine DEP.

I. The Contractor shall provide the MTA with a 7-day notice of request to shut down the existing gas and diesel fuel system and bring the temporary fuel system online. Once the Aboveground Fuel Tanks and Fuel Dispensers for the Temporary Fuel Systems are operational and accepted by the Owner, the Contractor will be allowed a maximum 24-hour period to shut down the existing system and turn on the temporary system; this includes setup of the temporary traffic control pattern to allow access to temporary fueling. Contractor shall coordinate demolition of the existing (Underground Fuel Systems) with the Owner's fuel vendor (CN Brown) for removal of dispensers by CN Brown. Contractor to demolish the balance of the existing Underground Fuel System and install the new fuel systems, consisting of, but not limited to, the underground tanks, dispensers, pumps, electrical, communication, alarms, sensors and probes and fuel management systems per Section 803.

J. Once the new fuel systems are installed, tested, commissioned, operational and accepted by the Owner, Contractor shall decommission the Aboveground tanks and dispensers and coordinate removal of the tanks with rental company, as well as removal of the dispensers with CN Brown. The contractor, upon a 7-day notice, will be allowed a 24-hour period to shut down the temporary system and bring the new permanent fuel system online; this includes setup of the traffic control to allow access to the new fueling areas.

K. Smoking, open flame or other sources of ignition shall be prohibited within 25 feet of the dispensing area. Legible signs with the words "NO SMOKING" printed on them shall be posted in highly visible locations around the dispensing area.

L. Pursuant to 38 MRSA 570-K, a spill prevention, control, and countermeasure (SPCC) Plan prepared in accordance with the code of federal regulations 40 CFR Part 112 by a Maine P.E. shall be implemented for the temporary AST fuel systems. The Contractor will be responsible for providing the SPCC Plan and for coordinating this effort with the MTA as required.

802.03 Materials

A. Temporary AST's shall be provided with a method of normal and emergency venting. The diameter of normal and emergency vents shall be in accordance with the fire code. Emergency vents shall be arranged to discharge in a manner that prevents overheating or flame impingement on the tank in the event vapors from such vents ignite.

B. Fill openings for the temporary AST's shall be equipped with a closure designed so that it may be locked. The fill opening shall be separate from the vent opening.

C. Contractor shall coordinate rental of Temporary ASTs with a tank rental company (Berco Tank, On-Demand Fuel Tank Rental, or approved equal). The two temporary tanks shall consist of double wall steel construction conforming to UL 2085. Each rental tank system shall include:

1. Remote Fill with Spill Box (2" for diesel and 3" for gasoline)
2. Required normal and emergency vents
3. Mechanical Level Gauge
4. Spare opening for submersible pump installation
5. Spare opening for stage 1 vapor connection for gasoline tank only.

D. Tanks shall be clearly marked with the name of the product that they contain

E. Submersible Turbine Pumps

1. Gasoline Pumps – Provide 3/4 HP, fixed speed submersible pump; check valve, air eliminator, vapor siphon, and piping line leak detector.
2. Diesel Pump - Provide 3/4 HP, fixed speed submersible pump; check valve, air eliminator, vapor siphon, and piping line leak detector.

F. Steel Piping and Fittings

1. Steel Pipe for Threading: Standard Weight, Schedule 40, black or galvanized; ASTM A 53, or ASTM A 135. Black piping to be used for diesel lines.
2. Malleable Iron, Steam Pattern Threaded Fittings - 150 lb Class: ASME B16.3.
3. Unions: Malleable iron, 250 lb class, brass to iron or brass to brass seats.
4. Couplings: Same material and pressure rating as adjoining pipe, conforming to standards for fittings in such pipe. Use taper tapped threaded type in screwed pipe systems operating in excess of 15 psig.
5. Nipples: Same material and strength as adjoining pipe, except nipples having a length of less than one inch between threads shall be extra heavy.

G. Joining and Sealant Materials

1. Fuel Resistant Thread Sealant:
   a. Rectorseal Corp.'s Rectorseal No. 5
   b. EMCO Wheaton Inc.'s Joint Seal or approved equal.
2. Malleable Iron, Steam Pattern Threaded Fittings:
   a. Oiled Oakum: Manufactured by Nupak of New Orleans, Inc., 931 Daniel St., Kenner, LA 70062, (504) 466-1484.
3. Anti-Seize Lubricant: Bostik Inc.'s Never Seez or Dow Corning Corp.'s Molykote 1000.
4. Corrosion Protective Tape System: 3M Co., St. Paul, MN.
   a. Tape: Scotchrap 50 or 51.

b. Primer: Scotchrap pipe primer.
c. Putty (if required): Strip Caulk insulation putty.

802.04 Construction Requirements

A. Install piping at approximate locations indicated and at maximum height as shown on the drawings.

B. Make allowances for expansion and contraction.

C. Allow for a minimum of one-inch free air space around pipe or pipe covering, unless otherwise specified.

D. Install horizontal piping with a constant pitch, and without sags or humps.

E. Install vertical piping plumb.

F. Use fittings for offsets and direction changes as needed.

G. Cut pipe and tubing ends square; ream before joining.

H. Threading: Use American Standard Taper Pipe Thread Dies.

I. Pitch horizontal above ground piping upward from tank 1/8 inch per foot minimum.

J. Smoking, open flame or other sources of ignition shall be prohibited within 25 feet of the dispensing area. Legible signs with the words "NO SMOKING" printed on them shall be posted in highly visible locations around the dispensing area.

K. Electrical wiring and equipment in the dispensing area shall be installed in accordance with the electrical code.

L. A portable fire extinguisher with a minimum classification 2A-40-B:C shall be provided adjacent to all dispensers and located at the kiosk.

M. An emergency spill kit for minor spills shall be provided and located near the temporary kiosk for use by the store employees. This kit will consist of a barrel type container that includes absorbent material (speedy dry/granular cellulose), absorbent pads, absorbent pillows/booms, gloves, safety googles, and disposal bags.

802.05 Method of Measurement

The Aboveground Diesel Tank Installation will be measured as Lump-Sum unit for, but not limited to: obtaining/leasing, off-loading, setting, electrical and communications supply and connection, point-of-sale coordination, testing, commissioning, decommissioning, loading, transporting, and downloading a complete functioning temporary fuel system, including state and local permitting.

The Aboveground Gas Tank Installation will be measured as Lump-Sum unit for, but not limited to: obtaining/leasing, off-loading, setting, electrical and communications supply and connection, point-of-sale coordination, testing, commissioning, decommissioning, loading, transporting, and downloading a complete functioning temporary fuel system, including state and local permitting.

802.06 Basis of Payment

Payment will be made under:

Pay Item		Pay Unit
802.10	Aboveground Diesel Tank	Lump Sum
802.20	Aboveground Gasoline Tank	Lump Sum

SPECIAL PROVISION

SECTION 803

MOTOR FUEL DISPENSING SYSTEMS

803.01 Description

This Section defines the requirements for motor fuel dispensing systems. Equipment, appurtenances, and locations are indicated on the Contract drawings. All tanks, tank fittings, equipment and monitoring devices shall be manufactured and installed to meet Maine Department of Environmental Protection Chapter 691, Rule for Underground Oil Storage Facilities and applicable requirements of the National Fire Protection Association standards.

803.02 General

Generally, the work shall include, but not be limited to:

1. Contractor is responsible for all installation, testing and commissioning work for complete and operational underground storage and dispensing fuel systems. This work includes modifications to the existing fuel system, as well as the new truck diesel fuel system.
2. The tanks shall meet the requirements of this Section and shall be coordinated with the applicable provisions of other parts. Other equipment and appurtenances will be manufactured, tested, and installed to meet ME DEP 691, NFPA 30, 30A, and 70, UL 971, UL 1316, API, PEI and other applicable codes.
3. The proposed double-walled fiberglass underground storage tanks; one 15,000-gallon single compartment tank and one 15,000-gallon split compartment tank (10/5 split) including double wall tank sumps, deadmen and straps to be provided by the Contractor. Contractor is responsible for coordinating delivery of the tanks to the site and installation of the tanks.
4. Contractor to submit the Maine DEP “Registration Form for Underground Oil Storage Facilities” at least 10 days prior to commencement of installation.
5. Provide materials and equipment that are standard products of a manufacturer regularly engaged in the manufacturing of such products, of similar material, design and workmanship.
6. All tanks and piping shall be installed by a Certified Underground Oil Storage Tank Installer who has been properly certified by the State of Maine, Department of Environmental Protection and the product manufacturer.
7. Each installation Contractor shall have taken, if applicable, Manufacturer's training courses on the installation of fuel storage tanks and shall meet all applicable licensing requirements in the state. Submit a letter listing prior projects, the date of construction, a point of contact for each prior project, the scope of work of each prior project, and a detailed list of work performed.
8. Certified underground oil storage tank installers shall not install a storage tank if the installer has been placed on an inactive status or if the installer’s certification has been suspended or revoked and has not been reinstated as described by the State of Maine, Department of Environmental Protection.

9. Shop Drawings: Contractor shall submit shop drawings and installation instructions for equipment. Provide submittals on the following items:
    1. Storage tanks and appurtenances
    2. Submersible Turbine Pumps (STPs)
    3. Product piping
    4. Vent piping
    5. Dispenser Sumps (double wall)
    6. Isolation Ball Valves
    7. Emergency shutoff (Crash) valves
    8. Manhole & other covers
    9. Flexible connections
    10. Leak detection panel and sensors
10. Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations. Replace damaged or defective items at no additional cost to the Authority.
11. Exposed moving parts, parts that produce high operating temperatures and pressures, parts that may be electrically energized, and parts that may be a hazard to operating personnel shall be insulated, fully enclosed, guarded, or fitted with other types of safety devices. Install safety devices so that proper operation of equipment is not impaired.
12. Conditions at the MTA Service Plaza will expose the fueling system to extreme temperatures, precipitation and concentrated highway deicing chemicals. products incorporated in the work shall be of high quality designed and constructed for the environmental conditions exposed.
13. In the event that ledge is encountered, it shall be removed by drilling and hoe ram in accordance with MTA Supplemental Specification 105.2.7 and Section 203. Contractor shall plan on blasting not being allowed; however, they may request written permission from MTA. Ledge shall be removed to a depth of at least one foot below the tank bottom elevation. removal shall extend a sufficient distance outside the tank footprint to permit a minimum distance of two feet clear distance between the tank shell and ledge.
14. The contractor shall complete and submit the certification of proper installation to the Maine DEP within (30) days of completion of project.

803.03 Materials

803.03.1 Tank and Appurtenances

A. Underground Storage Tank

Provide a factory-fabricated, double-walled storage tank that conforms to UL 1316, NFPA 30 and NFPA 30A. Tank shall be designed and manufactured for an underground, horizontal installation. The tank shall have a hydrostatic monitoring system. The fluid for the interstitial space shall be a brine antifreeze solution. The entire interstitial space shall be monitorable for leaks from a fiberglass reservoir on top of the tank. Tank will require concrete deadman, hold down straps and accessories as recommended by the tank manufacturer.

New underground storage tanks shall bear a stencil, label or plate which contains the standard of design by which the tank was manufactured, the year in which the tank was manufactured, the dimensions and capacity of the tank, and the name of the manufacturer.

A certificate which shows all of the information required above and which shows the date of installation and the regulated substances and percentages by volume of any additives which may be stored permanently and compatibly within, shall be conspicuously displayed and permanently affixed at the facility premises.

Tank shall be constructed of fiberglass reinforced plastic (FRP) and shall conform to UL 1316. The UL 1316 label shall be affixed to the exterior surface of the tank. The tank shall be certified compatible with gasoline, diesel fuel, methanol, ethanol and bio-diesel fuels and fuel additives. The tank manufacturer shall be Containment Solutions, Inc., or an approved equal. Tank shall be supplied with the following:

Flanged Manway – The standard manway is 22" I.D. and will be furnished with UL listed gaskets and covers for each tank compartment. Manway shall have four (4) factory installed 4" diameter threaded NPT fittings for pump and equipment mounting as indicated on the Contract Drawings.

Hydrostatic Monitoring Reservoir – The tank shall have an integrally mounted annular space reservoir installed on the tank for factory installed brine and continuous hydrostatic monitoring. The reservoir shall be constructed of fiberglass reinforced plastic materials and be included in the tank warranty. The monitoring fitting for the monitoring space shall be a 4" NPT fitting.

Double Wall Fiberglass Secondary Containment Collar – Double Wall tank collars shall be 42" diameter factory installed and constructed of fiberglass reinforced plastic. The collar shall include an internal and external EZ-Fit adhesive channel.

Double Wall Fiberglass Polygon Tank Sump – Double Wall tank sumps with a hydrostatic reservoir shall be supplied by tank manufacturer and constructed of fiberglass reinforced plastic. Sumps shall have a monitoring space between the walls to allow for the free flow of monitoring fluid in all directions. The tank sump shall be 42" diameter, with a 24" high polygon base with 19" panels for piping entry points. A 34" O.D. watertight lid shall be provided. Containment collars, sumps and adhesive kit shall be designed and supplied as a containment system by the tank manufacturer. No substitutions shall be allowed.

Adhesive Kit - Adhesive kit shall be supplied by the tank manufacturer and provide a watertight seal at the tank sump and containment collar joint to prevent the ingress of water or egress of fuel. The adhesive kit includes resin, catalyst, mixing stick, putty knife, sandpaper, grout bag, and installation instructions.

Tank Anchor Straps and Turnbuckles – Straps and galvanized turnbuckles shall be supplied by the tank manufacturer. The quantity and location shall be per tank manufacturer's requirements.

Prefabricated Concrete Deadman Anchors - Provide tank manufacturer's standard concrete deadman and connectors. Size and quantity shall be per tank manufacturer.

Tank Striker/Impact Plates - Tanks shall come with factory installed interior striker/impact plates under each tank manway and 4" NPT fittings. Each plate shall be a minimum of 1/4 inch in thickness, be larger in diameter than the tank penetration, fit the curvature of the tank bottom, be factory connected (full circumference) to the tank bottom, and be completely coated in the same fashion as the interior tank bottom coating.

Tank Top Fittings – Provide factory installed 4" threaded NPT fittings on tank top to accommodate fill and vent risers as indicated on the Contract Drawings.

B. Tank Top Equipment

Riser Pipe – Provide 4" galvanized steel schedule 40 riser pipe at fill, vapor and interstitial monitoring tank top fittings. All galvanized risers in contact with backfill material shall be coated with 1/8" fiberglass coating or a two-part epoxy coating (Sikagard-62) or approved equal.

Tank Manhole - Provide 42" lightweight composite gasketed cover as manufactured by Emco Wheaton or an approved equal. Manhole cover shall meet AASHTO HB20 wheel load rating. Provide 1' crown around manhole cover.

Fill Spill Containment – Provide 15-gallon double wall below grade spill container with mechanical interstitial monitoring and gasketed cover with 4" NPT thread connection and no drain. Provide Fill Swivel Adapter and Fill cap. Provide Riser seal adaptor for gasoline fills. Spill containment as manufactured by Emco Wheaton or an approved equal. Provide 1" crown around manhole cover.

Tank fill and vapor recovery covers shall be color coded per API 1637 (diesel-yellow, regular gasoline-white, premium grade-red, vapor recovery-orange).

Vapor Recovery Spill Containment (gasoline) – Provide 5-gallon single wall below grade spill container and gasketed cover with 4" NPT thread connection and no drain. Provide Brass Swivel Adapter and Vapor cap. Provide Riser seal adaptor for gasoline fills. Spill containment as manufactured by Emco Wheaton or an approved equal. Provide 1" crown around manhole cover.

Vent Extractor (diesel) – Provide 18" light weight composite cover as manufactured by Emco Wheaton or an approved equal. Manhole cover shall meet AASHTO HB20 wheel load rating. Provide 1" crown around manhole cover. Provide 4" pipe cap on 4" riser pipe cap on 4" Schedule 40 threaded nozzle.

Interstitial Monitoring Manhole - Provide 18" light weight composite cover as manufactured by Emco Wheaton or an approved equal. Manhole cover shall meet AASHTO HB20 wheel load rating. Provide 1" crown around manhole cover.

Vent Extractor Valves – Provide Tee style cast iron vent extractor valves to accommodate tank vent piping. Valve is installed on 4" NPT tank top fitting for the vent connections. Valve as manufactured by Emco Wheaton or an approved equal.

Overfill Prevention Alarm (primary) – Provide primary overfill protection consisting of an audible (horn) and visible (red light) alarm when the tank receiving a delivery reaches 90% capacity. The Overfill Protection shall consist of a combination of an Overfill Alarm Unit and an Alarm Acknowledgment Switch. The audible alarm must be programmed to stay on until the acknowledgement switch is activated.

Overfill Prevention Valve (secondary) – Provide 4" aluminum drop tube assembly and float actuated overfill valve. Float valve shall provide positive fuel shut-off at 95% total storage tank capacity. Drop tube and float valve as manufactured by Emco Wheaton or an approved equal.

803.03.2 Piping System

A. Double Wall Fiberglass Dispenser Sump – Provide a double wall fiberglass dispenser sump with interstitial monitoring port. Sumps shall have a monitoring space between the walls to allow for the free flow of monitoring fluid in all directions. The Sump shall be supplied by Franklin Fueling or approved equal and shall be compatible with the dispensers as supplied by CN Brown. The sump will have no conduit penetrations into the sump.

B. Flexible Fuel Product Piping - Provide UL 971 flexible coaxial piping with integral primary and secondary conduit, 100 psi working pressure or greater. Piping shall be certified compatible with gasoline, diesel fuel, bio-diesel, and fuel additives. APT XP piping as manufactured by Franklin Electric or an approved equal. Unless otherwise indicated, primary fuel piping shall be 1 ¾" inch diameter. All product lines shall have a slope toward the tank or a containment sump with leak detection at a minimum slope of 1/8 inch per foot, or in accordance with the manufacturer's instructions. Provide test boots and clamshell fitting as required for piping installation.

C. Fuel Product Pipe Ducting – Provide 4" XP pipe ducting as manufactured by Franklin Electric or an approved equal. The 4" inside diameter allows XP pipe to be easily installed and will allow replacement of pipe in the future without the need to excavate the site.

D. Double Wall Product Piping Entry Fitting – Provide Ducted Double Wall Rigid Entry Boots suitable for use with 1 ¾" XP piping, duct and double wall fiberglass sumps as manufactured by Franklin Electric or an approved equal. Sump penetrations shall be sealed to ensure that liquid will not escape from the sump if the liquid level within the sump rises above the pipe penetration.

E. Electrical Entry Fittings (for tank sumps) – Provide double wall entry fittings suitable for use with ¾" conduit and 1' conduit (for pump power) and double wall tank sumps as manufactured by S Bravo Systems or an approved equal. Sump penetrations shall be sealed to ensure that liquid will not escape from the sump if the liquid level within the sump rises above the pipe penetration.

F. Vent Piping - Provide UL listed rigid single-wall fiberglass piping for venting of petroleum storage tanks. Piping shall be certified compatible with gasoline, diesel fuel,

bio-diesel, E85 fuels and fuel additives. Manifolded vent size and above ground segment of vent riser shall be 3" for gasoline vent lines. Diesel vent lines and riser shall be 2". FRP piping as manufactured by NOV or approved equal.

G. Flex Connector (if required) - Provide braided stainless steel flexible connector. Diameter to match attached piping, length as required for installation.

H. Isolation Ball Valve - Provide full port stainless steel ball valve as manufactured by Morrison Brothers or approved equal. Valve shall be fire safe per API 607 sized to match attached piping.

I. Emergency Shut-off Valve - Provide 1 ½ inch or 2-inch double-poppet emergency shut-off valves on fuel supply lines at dispenser sumps. A 1 ½" single-poppet shut off valve shall be used on the diesel "satellite-out" line. OPW 10 Plus Series or an equivalent.

803.03.3 Leak Detection Monitoring

A. Automatic Tank Gauge (ATG) - Maintain existing Veeder Root TLS 450 PLUS automatic tank gauge leak detection console, interface modules and associated programming. Provide necessary upgrades to interface modules and software to allow communication of tank level and leak detection data to a remote PC in the manager's office. Mount panel within the service building storage room as directed by the Owner's representative. Contractor shall provide documentation of programming and system setup. Manufacturer's technical representative shall provide formal training in the use, operation, and system features.

B. Inventory Control Probe - Provide magnetostrictive (MAG) tank gauge probe for precision inventory control and in tank water and leak detection for an 8' diameter tank. Probe shall be compatible with existing Veeder Root TLS 450 PLUS ATG to provide tank gauging and leak detection.

C. Sump Monitoring Sensors - Provide solid state non-discriminating sump sensor for dispenser sumps and tank sumps. Sensors shall be capable of water and product sensing of 1" depth or less. Interface with Veeder Root TLS 450 PLUS ATG. Sump sensor shall be mounted at lowest part of sump and located inside of a universal sensor mounting kit.

D. Double Wall Sump Interstitial Sensor – Provide single-point mini-hydrostatic sensor that detects fluid level changes in the interstice reservoir of the double wall sumps. The sensor shall interface with the Veeder Root TLS 450 Plus ATG.

E. Tank Hydrostatic Interstitial Sensor - Provide dual-point hydrostatic reservoir sensor that detects fluid level changes in the interstice reservoir of double-wall tanks where the interstitial space is filled with a liquid brine solution. The Dual-Point Hydrostatic Reservoir Sensor is ideal for high groundwater areas and can differentiate between a high level alarm condition and a low level alarm condition. The sensor shall interface with the Veeder Root TLS 450 Plus ATG.

F. Pressurized Line Leak Detectors – Provide digital pressurized line leak detector (DPLLD) as manufactured by Veeder Root for use with an FE Petro or approved equal submersible turbine pump.

G. Outdoor fire extinguishers (80:bc) are to be located within 100' of dispensing area per NFPA 30A.

803.03.4 Submersible Turbine Pumps (STP)

A. Gasoline Pumps - Provide two (2) four (4) HP, three-phase, variable speed, two-stage STP; check valve, air eliminator, vapor siphon, piping line leak detector, and variable speed controller interface for the regular and gasoline tanks. One STP for Regular tank and one STP for Premium sump. Pump shall be capable of maintaining flow of 10 gpm to up to eight dispenser nozzles simultaneously (80 gpm at 100 feet discharge head). FE Petro Magshell or an approved equal.

B. Diesel Pump - Provide two (2) four (4) HP, three-phase, variable speed, two-stage STP; check valve, air eliminator, vapor siphon, piping line leak detector, and variable speed controller interface. One Pump shall service the commercial diesel dispensers and be capable of maintaining flow of 20 gpm to up to four commercial diesel dispenser nozzles simultaneously (80 gpm at 100 feet discharge head). The other pump shall service the retail diesel dispenser and be capable of maintaining flow of 10 gpm to up to eight retail diesel dispenser nozzles simultaneously (80 gpm at 100 feet discharge head) . FE Petro Magshell or an approved equal. Each pump will house a Veeder Root DPLLD and be run independently to each fuel system.

803.04 Construction Requirements

803.04.1 Tank and Appurtenances - The Contractor shall use appropriate techniques to install the UST as noted on the design plans. Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Handle storage tanks with extreme care to prevent damage during placement and install in accordance with the manufacturer's installation instructions and NFPA 30 or NFPA 30A, as applicable. Inspect the exterior surface of each tank for obvious visual damage prior to and during the placement of each storage tank. Repair surface damage to a storage tank according to manufacturer's requirements before proceeding with the system installation.

A. The Contractor shall install sheeting and/or shoring, or otherwise protect open excavations, in accordance with OSHA requirement to allow installation of the UST and to protect the workers from sliding or cave-ins. All surface water shall be diverted to prevent direct entry into the excavation.

B. FRP Tank Handling - Contractor shall handle tank with extreme care to prevent damage during installation and transportation to the site. Any damaged tank shall be replaced or repaired and tested under by the tank manufacturer, using the manufacturer's written procedures, at the Contractor’s expense.

C. Open excavations and stockpile areas shall be secured while awaiting completion of the installation and confirmation of tank and piping tightness test results. Excavations shall be backfilled as soon as possible after the installation has been completed, in accordance with the design plans.

D. Dewatering of the excavation, if necessary, shall be limited to allow adequate access to the tank and piping, to ensure a safe excavation, and to ensure that compaction and moisture requirements are met during backfilling. Groundwater shall be collected in temporary holding tank(s) and handled per Special Provision 203 Excavation and Embankment (Contaminated Soil and Groundwater Management).

E. FRP Tank Installation Procedures – Contractor to set tank on a minimum of one foot of backfill material as specified in the drawings.

803.04.2 Piping System

A. The Contractor shall install all fill, vent, and supply piping for the tanks in accordance with the design drawings and manufacturer specifications. Minor revisions to pipe routing will be permitted only when a minimum slope of 1/8" per foot toward the tank can be maintained.

B. Piping trenches should be dug straight when possible. If changes in direction are required, trench corners should be cut at 45º angles to allow for the piping run's proper bend radius. There must be a minimum of 6" of space between the outside of a piping run and a trench wall. The minimum allowable pipe bend radius for all XP series piping is 36".

C. Clean, compacted sand or pea gravel, or ⅛ to ¾" or smaller crushed rock (without sharp edges) should be used as backfill material for product and vent piping. There must be a minimum of 4" (10.16 cm) of approved backfill material under, and between, piping runs. Backfill material must not be contaminated with any petroleum product or other contaminant and must meet the requirements published in APT® warranty.

D. Avoid pipe crosses, but if they are unavoidable, try to keep them close to and not over the tanks. Always maintain a minimum of 6" of backfill material under, and between, the piping runs. The backfill above the highest crossover pipe and each side of the piping must be a minimum of 6".

E. All rigid underground vent piping shall be installed to provide a minimum straight run of 4' (measured from edge of fitting to edge of fitting) shall be provided at all fixed attachment points and changes in direction. Piping shall be installed in a suitable, manufacturer-approved, bedding material.

F. All vent piping that is accessible from the exterior ground surface shall be constructed of minimum Schedule 40 steel. Steel piping in direct contact with the ground shall be coated with epoxy and installed as noted on the design plans. The vent riser shall be installed to provide 14' clearance from the ground surface to the gasoline pressure/vacuum (P/V) cap and atmospheric diesel cap. Ensure that 10'

separation is provided between P/V cap and any electrical fixtures including the high level alarm mounted to the vent risers.

G. New fuel piping shall be fitted with pressure test boot fittings at each sump/containment penetration. at the completion of the work, test fittings shall be disengaged from the secondary piping interstice, and left in place.

H. All piping and ancillary equipment shall be tested in accordance with manufacturer's requirements and the state-approved testing program indicated on the design plans. Passing test results shall be conveyed to the Owner, and the state regulatory agency for approval prior to completion of backfill.

I. Warning Tape - Buried Warning and Identification Tape: Provide detectable aluminum foil plastic-backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried cable and conduit. Tape shall be detectable by an electronic detection instrument. Provide tape in rolls, two inches minimum width, color coded for the utility involved with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall be "CAUTION BURIED ELECTRIC CABLE BELOW" or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.

J. The fuel dispensers are being provided by CN Brown. The Contractor shall review CN Brown Furnished Equipment, assess any missing components, include missing items in the final design for review by Owner and provide those items as needed to complete the installation of this system.

803.04.3 Testing - the following tests shall be certified by the installer prior to backfilling and copies of the result shall be provided to the owner and professional engineer at the time of backfill inspection:

A. Underground Storage Tank Tightness Tests - Perform a tightness test on each underground storage tank on-site just prior to their placement into the ground. Test shall be the brine level test type.

B. Tank Manufacturer's Tests - Perform any tests on each storage tank that is required by the tank manufacturer's written test procedures and Maine DEP. Manufacturer's tests that are redundant to tests already required by this specification will only be performed once per tank. Repair all leaks discovered during the tests in accordance with manufacturer's instructions. Following all tank repairs, re-test the tank at the Contractor's own expense until the tank successfully passes the manufacturer's testing requirement.

Tank manufacturer's checklist must be completed (including all tank deflection measurements) by contractor.

C. Product Piping (Primary Line) - Apply an air source to the XP piping. pressurize the line to between 50 and 100 psi (3.5 and 6.89 bar) and allow the pressure to settle. after piping is pressurized, soap all joints and fittings. If a leak in the termination fitting is discovered relieve the air pressure, retighten and repressurize. The duration of the test may vary, check with the local authority or inspector to verify requirements. APT recommends a minimum of a 1-hour pressure test should be observed with no pressure loss. Upon completion of a passing pressure test, pressure can be relieved, or pressure may be held until backfill and concrete is poured.

NOTE: If pressure is left on the piping system for an extended period of time, thermal expansion or contraction may cause the piping pressure to fluctuate.

D. Product Piping (Interstitial Space) - It is critical to verify that the scuff guard has been properly cut back to be even with or outside of the containment sump to ensure that the APT ducted entry boot as well as the test boot seals to the SC jacket and not on the scuff guard for this pressure test. If the test boot is not sealed directly onto the SC jacket, this could lead to false readings. Once the test boots are in place, pressurize the piping to between 5 and 8 psi (0.34 and 0.55 bar). After the pressure has stabilized, disconnect the air supply and monitor the system for leakage. The line needs to remain pressurized for a minimum of one hour with no pressure loss detected in order for the piping to pass. the contractor shall maintain the required pressure for a minimum of 2 hours after the backfill process has been completed.

NOTE: After testing the secondary line, open the test valves and pull back the test boots to allow any leak from the primary line to enter into the sump where it can be detected.

E. Vent piping (Single wall Fiberglass) - Visually inspect all joints for proper insertion and adhesive cure prior to pressurizing the system. A gap between the adhesive bead and the fitting shoulder indicates the possibility that a joint failure exists and the contractor shall make any necessary repairs before pressurizing the piping system. Check the integrity of the joints by pressurizing the system to 25 psig and holding the pressure for a minimum of one minute. Soap all joints to test for leaks. if there are no leaks, raise the line pressure in the system to a maximum of 50 psig. Again, hold the pressure for at least one minute and soap all joints to check for leaks. After the piping has passed the 50 psig pressure test, reduce the pressure to 25 psig and maintain until all paving has been completed.

WARNING: Do not air test lines that have contained hazardous, flammable, or combustible liquids or vapors unless they are purged and made safe beforehand. If purging is not feasible, an inert gas such as nitrogen or helium may be used to pressurize the piping.

F. Hydrostatic testing of dispenser and tank containment sumps - The new sumps shall be hydrostatically tested for tightness in accordance with Maine DEP (chapter 691) as follows:

1. After all seams and fittings have been completed and all piping and conduits have been installed;
2. At a level that is 3" above the highest penetration.

3. By recording the liquid level measurements at the beginning and end of the test;
4. For a minimum of 3 hours; and
5. With no addition of liquid to the sump.

A passing hydrostatic test shall have no loss of liquid or observed leaks after the complete duration of the test.

G. Interstitial testing of double wall containment sumps – The interstitial space of double wall containment sumps shall be **Carefully** tested per manufacturer's published installation instructions.

H. Spill Containment (Emco Wheaton) - Emco Wheaton double wall spill containment manholes are vacuum tested, both primary and secondary, prior to shipment to ensure that no damage has incurred during shipment or installation. All spill containment manholes must be tested using the following method:

Secondary integrity test (vacuum):

1. Remove the gauge from the inspection port and install the test adapter p/n 494343 (included with the vacuum apparatus).
2. Attach air pressure source to air pressure regulator on vacuum apparatus.
3. Slowly apply vacuum of 30" wc to the interstitial space; wait 30 seconds. reapply 30" wc.
4. Ensure switch is in off (center) position, start timer and record remaining vacuum after 1 minute.
5. If the remaining vacuum after 1 minute is 26" wc (1.9" mercury) or greater, both the primary and the secondary containment vessels are tight.
6. If the test fails, repeat the test. If the test fails a second time, then perform pressure test per manufacturer specifications.
7. Replace components or repair as necessary.
8. Reinstall gauge (or push button test port assembly)

I. After installation of all fuel system components the contractor shall provide full commissioning to ensure all equipment is properly installed and operating in accordance with its design intent. Contractor must also provide all warranty documentation.

803.05 Method of Measurement

The proposed underground tank system installation, for both the gas and diesel systems, will be paid at the contract lump sum price for the pay item(s) listed below. Such payment shall be full compensation for, but not limited to, the: acquisition, off-loading, setting, providing and installing complete fuel delivery and monitoring systems, electrical and communications supply and connection, point-of-sale coordination, testing, and commissioning, state and local permitting, for a complete functioning fuel system, and all other incidentals such as excavation for trenching and providing for and installation of any aggregates necessary to complete the work in accordance with the Plans and these specifications. All labor, materials and equipment required will be incidental to this item.

Any tank, dispenser, or other Owner-Furnished Equipment lost or damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Authority.

803.06 Basis of Payment

Pavement is paid for separately under other appropriate items.
Payment for shoring will be paid under 524.30.

Payment will be made under:

Pay Item		Pay Unit
803.10	Underground Tanks (Gasoline and Diesel)	Lump Sum

SPECIAL PROVISION

SECTION 804

DIESEL CANOPY

804.01 Description

This work shall consist of furnishing and installing materials and components for a new diesel canopy over the new diesel dispenser slab, as well as all other related electrical and communication facilities, fire suppression system, canopy lighting, and drainage facilities needed for the new canopy as detailed in the Plan drawings and these specifications.

804.02 General

Generally, the work shall include, but not be limited to:

A. The proposed canopy system and foundation design shall be provided by the contractor and shall be stamped by a Professional Engineer licensed in the State of Maine. The designs shall be completed in accordance with the latest edition of the International Building Code, MaineDOT Standard Specifications, and project-specific Special Provisions. Canopy design is to be based on ASTM E2950-14 standard specifications for metal canopy system, fabrication techniques, and installation methods.

B. Contractor shall submit for approval detailed shop drawings and calculations for the proposed canopies and associated foundations. These shop drawings shall be signed and sealed by a Maine Licensed Professional Engineer, for approval within 21 days of the contract award.

C. Contractor shall submit a Fire Suppression Plan for the Diesel Canopy using the Pyrochem Attendant II pre-engineered fire suppression system. Clearance to the bottom of the fire suppression nozzles, from the ground, shall be 15’-0” minimum.

D. Heat traces shall be commercial grade, shall be placed in and along the canopy gutters to 4’ below slab grade and included in the system design (to include materials to be used) submitted for review and approval.

804.02 Materials

A. Columns

1. Structural steel tubing shall be used.
2. Square steel tube to be ASTM A500 Grade B, minimum yield strength 46 ksi.
3. Size to meet or exceed specific project design load requirements.
4. Provide each column with a 4” electrical access opening and cover plate.

B. Base Plates

1. ASTM A572, Grade 50 plate to be a minimum, ¾" thickness with welded gussets. Shop fabricated with pre-punched or pre-drilled bolt holes.

C. Top Plates

1. ASTM A572, Grade 50 plate to be a minimum ¾" thickness with welded gussets. Shop fabricated with pre-punched or pre-drilled bolt holes.

D. Structural Framing

1. ASTM A992, 50 ksi wide-flange steel beams shall be used.

E. Structural Connections

1. ASTM A36 structural steel for miscellaneous plates and angles.
2. All framing members shall be shop fabricated for bolted field assembly.
3. Domestic ASTM A325 high strength bolts shall be used. All ASTM A325 bolts shall be installed per the RSCS Specification for Structural Joints, contained in part 16, Specifications and Codes of the AISC Steel Construction Manual, latest edition.
4. Flange and purlin bracing where required.

F. Anchor Bolts

1. ASTM F1554 Grade 55 hex head bolt with a minimum yield strength of 55 ksi.
2. 1 ¼" diameter x 30" long standard bolt with the hex head embedded in concrete footer.
3. Threaded projection above footing shall be 7".
4. Double nuts and washers for each bolt shall be provided, one set to be used for plumbing and leveling.
5. Templates for setting anchor bolts shall be provided.
6. Templates shall be removed before setting column on foundation.

G. Painting

1. All framing members will be given one shop coat of drying red oxide primer.

H. Deck Panels

1. ASTM A792 Galvalume having an AZ50 aluminum-zinc coated surface, minimum yield strength of 50 ksi.
2. 20 gauge, 16" wide x 3" deep steel panels.
3. Panels are fastened to the wide-flange beams with an engineered screw type clamp and lock nut system.
4. No splicing of deck panels will be allowed.
5. Panels shall have a finish side coated with a full coat of polyester paint baked on over an epoxy primer. A whitewash coat of polyester baked on over an epoxy primer shall protect the reverse side.
6. Panels to be manufactured in sufficient length to avoid unnecessary center gutters.

I. Fascia - CN Brown to provide fascia decals

1. ACM Panels
   a. Aluminum composite material, of varying thicknesses, is a sandwich panel consisting of 2 aluminum sheets bonded to a polyethylene core.
2. Fascia Attachment Systems
   a. Fascia support braces to be 20-gauge galvanized steel. Braces are formed into a C-channel 1 ½" wide x 1 ¼" deep x 10' long.

J. Accessories

1. Gutter
   a. Straight sections to be ASTM A792 Galvalume having an AZ50 aluminum-zinc coated surface.
   b. Straight sections of 20-gauge steel are 8" wide x 6" deep.
   c. Straight gutter sections shall have a finish side coated with a full coat of polyester paint baked on over epoxy primer. A Whitewash coat of polyester paint baked on over epoxy primer shall protect the interior surface.
2. Downspouts
   a. External downspouts to be 4" x 3" roll formed 26 gage steel with watertight locked seams.
   b. Exterior paint with one full coat of polyester paint baked on over epoxy primer.
   c. Downspouts to be of one contiguous length up to 15'.

3. Collectors
   a. Collectors to be circular and constructed of gel-coated fiberglass.

4. External Drains
   a. 3" schedule 80 PVC with cleanout.

5. Hardware

   a. Gutter to deck panel fasteners shall be ¼" dia. x ¾" long self-drilling screws.

6. Sealant

   a. Tube sealant shall be 100% urethane caulk for water-proof areas, and silicone caulk for cosmetic.

804.04 Construction Requirements The work in this item generally includes, but is not limited to:

A. Concrete Footings

1. The Contractor shall pour all canopy footings in accordance with the manufacturer's requirements and the sealed design drawings. All footings shall be poured to the same top elevation.

2. Concrete canopy footings shall be constructed in accordance with manufacturer requirements, the sealed structural plans, and with MaineDOT Standard Specifications for Structures Division 500. At a minimum, concrete shall meet the requirements of the concrete slab.
3. Canopy footings shall be poured to a minimum depth below finished grade as required by local codes and ordinances. Supply and install sub-base materials in accordance with the canopy foundation design.

B. Steel and Accessories

1. Provide four square steel columns spaced as shown on the construction drawings.
2. Canopy clearance will be 16'-6" from the bottom of the fascia to the highest finished grade.
3. The canopy will have a 36" high ACM fascia on all four sides with square corners. Color shall be white from the manufacturer's standard options.
4. Canopy deck will be made from 16" 20-gauge steel with bottom deck design. Deck color will be pre-finished bronze from the manufacturer's standard options and have a smooth finish.
5. The canopy will have external drains with collectors. Gutter system shall be pre-finished bronze from the manufacturer's standard options.
6. Provide twelve recessed canopy light fixtures as noted on the construction drawings.
7. Provide electrical conduit in columns in accordance with construction drawings.
8. All columns and downspouts to be field painted gray in color with industrial grade rust-inhibiting primer finish. Final gray color selection to be made by Owner's representative.

C. General

1. The Contractor shall mastic coat all steel bolts in accordance with manufacturer's recommendations.
2. The Contractor shall paint steel canopy in the following manner and in accordance with MDOT Standard Specifications.
   a. Spot prime any scratched or damaged areas of factory installed primer and paint.
   b. Touch-up any primed steel with two (2) coats of exterior enamel to match factory applied paint.
   c. Do not prime pre-finished fascia.
   d. Complete all painting touch ups prior to attaching signage or other appurtenances to the canopy. Do not paint around signs and appurtenances.
   e. Any unpainted areas of structural steel shall be primed and painted, including the ends of the canopy columns.

3. The Contractor shall make connections between the canopy drain risers and the new underground drainage system, to provide a fully functioning system.

804.05 Method of Measurement

The proposed canopy system will be paid at the contract lump sum price for the pay items listed below. Such payment shall be full compensation for the design, detailing, fabrication, delivery, construction of the canopy, associated foundations, fascia decals, associated systems, and all other incidentals necessary to complete the work in accordance with the Plans and these specifications. All labor, materials and equipment required will be incidental to this item.

Drainage includes all canopy drainage items up to the first catch basin in the parking area.

804.06 Basis of Payment

The canopy will be measured by lump sum for the design, detailing, fabrication, delivery, and construction.

Payment will be made under:

Pay Item		Pay Unit
804.10	New Canopy (Diesel)	Lump Sum

SPECIAL PROVISION

SECTION 805

GENERAL ELECTRICAL REQUIREMENTS – FUEL SYSTEM

805.01 Description

A. Basic Electrical Requirements specifically applicable to special provisions sections 806, 807, 808, 809, 810 and 811.

805.02 References

A. ANSI/NFPA 70 - National Electrical Code.
B. ANSI C2 - National Electrical Safety Code.
C. ANSI/NFPA 101 - Life Safety Code.

805.03 Related Requirements

A. Conditions of the Contract - General Requirements, apply to all work, including work of this section as well as all 100 series sections. Examine all Contract documents for requirements affecting this work.

805.04 Submittals

A. Submit under provisions of Section 105.7.4 – Submittal Requirements.
B. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.
C. Mark dimensions and values in units to match those specified.
D. Provide fixture schedule, lighting drawings, panelboard schedules and single line or risers diagram(s) to supplier for assistance in pricing as applicable. Contractor shall receive one set of black line drawings for reproduction from the Resident Engineer for this purpose.

805.05 Regulatory Requirements

A. Conform to applicable local, State and Federal Building Code for the State of Maine.
B. Electrical: Conform to NFPA 70, NFPA 101, ANSI C2, 2 FM, UL, ASTM and ANSI Standards as applicable.
C. Contractor shall visit the site to become familiar with all existing conditions affecting this work. No claim shall be recognized for extra compensation due to failure of Contractor to familiarize himself/herself with the conditions and extent of proposed work.
D. D. Obtain all permits and request inspections as required by local authority having jurisdiction.

805.06 Project/Site Conditions

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Resident Engineer before proceeding.
C. The fuel dispensers are being furnished by C.N. Brown (contact through Resident) for installation by contractor. The Contractor shall review C.N. Brown-Furnished Equipment, assess any missing components, include missing items in the final design for review by Owner and provide those items to complete the installation of this system. Contractor shall coordinate with CN Brown for all electrical rough-in requirements and modify are required to suit.
D. Contractor shall provide temporary power, communications, alarm and point of sale (POS) connections to temporary fueling facilities. Temporary connections shall consist of, but not limited to the following:
    1. Temporary wood utility poles, Class 3, 30' total length, Southern Yellow Pine or Pacific Coast Douglas Fir, burial depth min. 5.5'.
    2. Minimum underclearance to all cable shall be the higher of 20' or as directed by the Resident.
    3. Pole Guying – As required.
    4. Pole Overhead cabling mounting hardware as required.
    5. Preassembled Aerial Cable: Aluminum or copper insulated conductors, rated 600 volts, cabled together in a reverse lay, laid parallel to a steel messenger and the assembly bound together with a helically wrapped binding strip. Assembly shall conform to either of the following:
        a. ICEA S-19-81/NEMA WC-3 Section 7.3: Preassembled Aerial cable.
        b. ICEA S-68-516/NEMA WC-8, Section 7.3: Preassembled Aerial cable.

805.07 Contract Drawings And Specifications

A. Drawings accompanying these specifications are intended to show general arrangement and extent of work to be done, exact location and arrangement of all components shall be coordinated with all contractors prior to any rough ins as determined in the field as work progresses. Anything shown on the drawings and not specifically mentioned in specifications or vice versa shall be considered as required in both.
B. Neither the specifications nor the drawings undertake to illustrate or describe all items necessary for the work; it is expected that the Contractor shall be familiar with all applicable codes and shall provide an electrical installation in conformance with such codes.
C. If, in the interpretation of contract documents, it appears that the drawings and specifications are not in agreement, the one requiring the greater quantity or superior quality shall prevail, as decided by the Engineer. Addenda supersede the provisions which they amend.
D. Locations of equipment, and materials, etc., as given on drawings are approximate unless dimensioned. It shall be understood they are subject to such modifications as

may be found necessary or desirable at time of installation in order to meet any structural conditions. Such changes shall be made by the Contractor without extra charges.

E. Because of small scale drawings, all required offsets, etc., as may be required to clear work of other Contractors, may not be shown. Contractor, however, shall provide all necessary offsets, etc., as required to complete the installation of their work and not conflict with that of others.

F. It is the intention that wiring systems shall be complete and fully operational. The Contractor shall identify system components during the bid process that clearly constitute conditions that would cause the system to be incomplete. Clarification: The remedy to these discrepancies shall be communicated by the Resident Engineer to all bidders or included as an addendum.

805.08 Materials and Labor

A. Bidders for this work shall carefully examine the Plans and Specifications, as the Contractor shall be required to furnish all materials and labor necessary to deliver to the Owner a complete system installed in full accordance with Local, State and Federal laws. The system shall be furnished as specified, tested, and turned over to the Owner in perfect operating condition.

B. All materials shall be new and of best quality of their respective kinds. Workmanship in all respects shall be of highest grade and all construction shall be done according to best practices of the trade. Materials shall be warrantied directly by the manufacturer.

C. Contractor shall provide, when required for review of Resident Engineer, labeled samples of any material or equipment specified herein or proposed to be used on this Project.

D. Where words "furnish", "provide" or "install" are mentioned, either singly or in combination, these words are hereby interpreted to mean "furnish and install" or "provide and install," including all materials complete with all connections, supplemental devices, accessories and appurtenances, unless specifically otherwise noted. These words are likewise hereby interpreted as being prefixed to all materials, equipment, and apparatus hereinafter mentioned, either in abbreviated or schedule information.

805.09 Protection of Work and Materials

A. Contractors shall be responsible for the care and protection of all materials delivered and labor performed until the completion of the work.

B. Cap all uncompleted lines, raceways, and ducts until ready for final connections, or future work as indicated.

C. All portions of the work liable to damage by weather or by those engaged on the Project, must be securely protected by temporary, but substantial covering which must be maintained in position until Resident Engineer authorizes removal.

805.10 Replacements

A. In the event of damage to any equipment or materials, immediately make all repairs

and replacements necessary to the approval of the Resident Engineer at no additional cost to the Authority, unless noted otherwise.

805.11 Safety Regulations

A. All work to be performed and/or installed shall conform to all requirements of the Occupational Safety and Health Act (OSHA) of 1970 and all Amendments thereto.

805.12 Quality Assurance/Control of Installation

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
B. Comply fully with manufacturers' instructions, including each step in sequence.
C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Resident before proceeding.
D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Perform work using persons qualified to produce workmanship of specified quality.
F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and physical distortion or disfigurement.

805.13 Schedule of Materials and Equipment

A. As soon as practicable, and before commencement of installation of any material or equipment, a complete schedule of materials and equipment proposed for installation shall be submitted for review. Schedule shall also include a list of all proposed subcontractors. Partial or incomplete lists will not be considered. Any materials, fixtures, and equipment not conforming to specifications may be rejected. Also see Section 105.7.4, Submittal Requirements.
B. Orders for purchase of any devices, material, conduit, etc., or other equipment shall not be placed until this schedule is reviewed.

805.14 Underwriter's Approvals

A. All electrical materials and equipment shall bear label of Underwriter's Laboratories, shall be listed by them in their list of electrical fittings and shall be approved by them for purpose for which they are to be used, unless materials and equipment are of a type for which Underwriter's Laboratories does not list or provide label service.

805.15 Substitutions

A. Where the specifications allow the substitution of a product for that which has been specified, said substitution must be reviewed by the Resident Engineer and shall be equivalent in all respects to that which is specified. The Resident Engineer’s decision shall be obtained on all questions as follows, and his/her judgment shall be final and binding on all parties.
B. Reference in the specifications or on the drawings to any product, material, fixture,

form or type of construction, etc., by proprietary name, manufacturer, make or catalog number, shall be interpreted as establishing a standard of quality or design and shall not be construed as limiting competition. The Contractor may, at his/her option, use any fully equivalent substitute provided written review by the Resident Engineer is first obtained indicating acceptance of the equality of the substitute preferred.

C. For materials or equipment which are supplied with integral or factory applied finish, the colors of same shall be considered in evaluating substitutions.

D. For the purpose of avoiding conflicts with other trades, contracts, and adjoining work where more than one (1) article, device, material, fixture, form or type of construction, etc., is referred to by proprietary name, manufacturer, make or catalog number, the first named shall be used as the basis of design and details. The cost of any changes of approved equivalent item shall be borne by the Contractor requesting such change.\

805.16 Record Drawings

A. During construction, the Contractor shall keep an accurate record of all deviations to the installation of the work as indicated on the drawings. Upon completion of the work, the Contractor shall furnish a copy of this record to the Resident Engineer, on a black line of the original which will be available from the Resident Engineer. Submit record drawings before requesting final payment.

805.17 Manufacturer's Representative

A. At appropriate times, or as directed by the resident, provide the services of a competent factory trained Engineer or Technician of the particular manufacturer of equipment or item involved, to inspect, adjust, and place in proper operating condition any and all such items of manufacture. No additional compensation shall be allowed Contractors for such service.

805.18 Manufacturers' Instructions, and Operation and Maintenance Data

A. Provide for each item of equipment or apparatus furnished, a complete set of printed instructions obtained from the manufacturer covering proper operation, care, lubrication, cleaning, servicing, adjustment, etc., together with any special safety instructions.

B. Manufacturers' data shall further include performance data (time current curves, where applicable), complete parts lists, recommended spare parts lists, and wiring diagrams.

C. Data shall be arranged in complete sets, properly indexed and marked.

D. Data shall include complete set of shop drawings.

E. Material shall first be submitted in preliminary fashion for review by Resident Engineer. After approval, Contractor shall submit two (2) copies in bound volumes to the Resident Engineer for distribution.

F. Provide contacts for service agencies for all major system components.

805.19 Guarantees

A. An item becomes "defective" when it ceases to conform to this Contract Document. Guarantees beginning on the date of issuance of the Owner's final payment, or certificate of substantial completion, with Owner taking occupancy or beneficial use thereafter.
B. Upon completion of the work and before applying for final payment, furnish a written guarantee, stating that the work complies with the provisions of codes listed herein and the local enforcing authorities, and that it will be free from defects of material and workmanship for the required guarantee period. All manufacturers written warranties shall apply to materials. Warranties other than that of the manufacturer are not acceptable.
C. The guarantee period shall be one (1) year except when longer periods are indicated for specific equipment.
D. All materials where a written warranty is published shall require the warranty to be offered by the product manufacturer.

805.20 Existing Utilities and Equipment

A. Extreme care shall be taken to protect existing utilities and equipment above and below grade and in all other locations. Information contained on drawings is not guaranteed as to location, invert, etc. but represent the best information available as to the location of underground and concealed utilities and equipment.

805.21 Energizing Equipment

A. Obtain Owner’s written approval before energizing any equipment.

805.22 Connection to Equipment

A. The Contractor shall be responsible for proper wiring and raceway connections to equipment, make sure of alignment, both initially and under operating conditions, and provide proper supports, brackets, means of expansion, etc., to make sure that no excessive stresses are applied to equipment. Raceways shall be run to the equipment and alignment checked before final bolting and fastening.
B. At the request of the Resident Engineer, dismantle equipment connections to demonstrate proper installation and make such corrections necessary without additional compensation for disassembly, re-connection, or the required corrective work.
C. Equipment shall be installed in such a manner as to permit disconnecting for service and repairs without the necessity of rigging.

805.23 Closing In Uninspected Work

A. General: Do not cover up or enclose work until it has been properly and completely inspected and approved.
B. Noncompliance: Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required, and after it has been completely inspected and approved, make all repairs and replacements with

such materials as are necessary to the approval of the Resident Engineer and at no additional cost to the Authority.

805.24 Cleaning of Systems

A. All wiring systems shall be thoroughly cleaned prior to initial operation and in accordance with manufacturer's instructions for equipment to be furnished and/or installed.
B. Furnish all detergents, solvents, cleaning compounds, tools, etc., required in connection with cleaning operations.
C. Thoroughly clean all exposed portions of all equipment, remove all labels, and wipe clean with a damp rag.

805.25 Testing, Balancing, and Adjusting

A. Electrical loads shall be balanced on all phase legs to a tolerance of plus or minus 10 percent. Include testing circuits for shorts to ground. Measure grounding system resistance. Correct all deficiencies. Provide all test equipment.

805.26 Instructions

A. On completion of the job, Contractor shall provide competent technicians to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed two-hours and be performed in a minimum of one interval. The time of instruction shall be arranged with the Owner. The Electrical subcontractor shall be present and participate in the Owner’s instruction.

SPECIAL PROVISION

SECTION 806

CONDUIT – FUEL SYSTEM

806.01 Description

A. PVC coated rigid metal conduit and fittings.
B. Liquid-tight flexible metal conduit and fittings.
C. Non-metallic conduit and fittings.

806.02 References

A. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.
B. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
C. FS WW-C-566 - Specification for Flexible Metal Conduit.
D. FS WW-C-581 - Specification for Galvanized Rigid Conduit.
E. NEMA RN 1 - PVC Externally-Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing.
F. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

806.03 Products

806.03.1 PVC Coated Rigid Metal Conduit and Fittings

A. Rigid Steel Conduit: ANSI C80.1.
B. PVC Externally Coated Conduit: NEMA RN 1 and UL 6: rigid steel conduit with external 40 mil PVC coating and internal urethane coated galvanized surface. Threaded type, coated with a polyvinyl chloride (PVC) sheath bonded to the galvanized exterior surface, Type A40, except that hardness shall be nominal 85 Shore A durometer, dielectric strength shall be minimum 400 volts per mil at 60 Hz, tensile strength shall be minimum 3500 psi, and aging shall be minimum 1,000 hours in an Atlas Weatherometer.
1. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.
2. Classified Hazardous Location: Fittings and conduit bodies as manufactured by Crouse-Hinds, Killark.

806.03.2 Flexible Metal Conduit and Fittings

A. Conduit: FS WW-C-566; steel.
B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

806.03.3 Liquid-Tight Flexible Conduit and Fittings

A. Conduit: Flexible metal conduit with PVC jacket.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

806.03.4 Conduit Supports

A. Conduit Clamps, Straps, and Supports: Steel or malleable iron.

806.03.5 Warning Tape

A. Buried Warning and Identification Tape: Provide detectable aluminum foil plastic-backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried cable and conduit. Tape shall be detectable by an electronic detection instrument. Provide tape in rolls, two inches minimum width, color coded for the utility involved with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall be "CAUTION BURIED ELECTRIC CABLE BELOW" or similar. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material. Tape shall be installed 12 inches below finished grade centered, above cable or conduit, where conduit trench width exceeds 2' provide (2) warning tapes 12" in from each edge of trench wall.

806.04 Conduit Sizing, Arrangement and Support

A. Unless otherwise indicated size conduit for conductor type installed, 1 inch minimum size.
B. Arrange conduit to maintain headroom and present a neat appearance.
C. Route exposed conduit parallel and perpendicular to walls and adjacent piping.
D. Maintain minimum six inch clearance between conduit and other piping. Maintain 12 inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
E. Arrange conduit supports to prevent distortion or misalignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.
F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.
G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

806.05 Conduit Installation

A. Cut conduit square using a saw or pipe-cutter; de-burr cut ends.
B. Bring conduit to the shoulder of fittings and couplings and fasten securely.
C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes.
D. Use conduit bodies to make sharp changes in direction, as around beams.
E. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than one inch size.
F. Avoid moisture traps where possible; where unavoidable, provide junction box with

drain fitting at conduit low point.

G. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
H. Provide No. 12 AWG insulated conductor or suitable nylon pull rope in empty conduit, except sleeves and nipples.
I. Install expansion joints where conduit crosses building expansion joints and where underground raceway is attached to fixed structures or an equipment.
J. Provide conduit seals and fittings rated for installation in Class I (Division 1), (Division 2), Group (C & D) classified hazardous areas. Installation shall comply with requirements of 1987 NEC NFPA 70 Articles 500, 501, 502 and 503, and manufacturer's recommended installation procedures. Wherever practical, conduit seals are required on either side of barriers between classified hazardous areas, and non-hazardous areas shall be installed in non-hazardous location. Fittings shall be manufactured by Crouse-Hinda or Killark.
K. Flexible conduit shall not exceed three (3) feet in length.

806.06 Underground Duct Bank Installation

A. Install top of duct bank minimum 30 inches below finished grade.
B. Install conduit with minimum grade of four inches per 100 feet.
C. Stagger conduit joints in concrete encasement six inches minimum vertically.
D. Use pre-manufactured interlocking conduit spacers installed not greater than four feet on centers. Securely anchor conduit to prevent movement during concrete placement.
E. Provide minimum four inches concrete cover at bottom, top, and sides of duct bank.
F. Provide two No. 4 steel reinforcing bars in top of bank under paved areas.
G. Contact Dig Safe at 1-888-344-7233 before beginning excavation work.
H. Install magnetic ribbon warning tape minimum 12 inches below grade, above duct bank location.

806.07 Conduit Installation of Schedule

A. Underground installations less than five feet from foundation wall: Rigid galvanized conduit. Use long sweep 90 degree bends.
B. Underground installations more than five feet from foundation wall: Schedule 80 Rigid PVC conduit. Use rigid galvanized steel conduit long sweep 90 degree bends.
B. In slab above grade: PVC coated rigid steel conduit.
C. Exposed Outdoor Locations: PVC coated rigid steel conduit.

806.08 Basis of Payment

A. Conduit shall be incidental to the applicable installations; 802.10, 802.20, 803.10, 804.10.

SPECIAL PROVISION

SECTION 807

BUILDING WIRE AND CABLE – FUEL SYSTEM

807.01 Description

A. Building wire and cable.
B. Low voltage control cable.
C. Wiring connectors and connections.

807.02 Related Sections

A. Section 806, Conduit.
B. Section 810, Identification.

807.03 References

A. ANSI/NFPA 70 - National Electrical Code.

807.04 Submittals

A. Submit under Special Provisions of Subsection 105.7.4, Submittal Requirements.
B. Product Data: Provide for each cable assembly type.

807.05 Qualifications

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years experience.

807.06 Regulatory Requirements

A. Conform to requirements of ANSI/NFPA 70.

807.07 Project Conditions

A. Verify that field measurements are as shown on Drawings.
B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project conditions.
C. Where wire and cable routing is not shown, and designation only is indicated, determine exact routing and lengths required.

807.08 Coordination

A. Coordinate work under provisions of Subsection 105.7.4, Submittal Requirements.

B. Determine required separation between cable and other work.
C. Determine cable routing to avoid interference with other work.

807.09 Products

807.09.1 Manufacturers – Building Wire and Cable

A. American Insulated Wire Corp
B. Carol Cable
C. The Okonite Co
D. Paranite Essex Group
E. SouthWire

807.09.2 Building Wire and Cable

A. Description: Single conductor insulated wire.
B. Conductor: Copper. Minimum size 12awg.
C. Insulation Voltage Rating: 600 volts.
D. Insulation Type: MTW, THHN/THWN.
E. Insulation Color: Color of all service, feeder, branch, motor control, and signaling circuit conductors shall be green for grounding conductors, and white for neutrals (except where neutrals of more than one system are installed in same raceway or box, the other neutral shall be white with a colored (not green) stripe). The color of the ungrounded conductors in different voltage systems shall be as follows:

    1. 120/208 volt, 3-phase:
       Phase A - black, Phase B - red, Phase C - blue

807.09.3 Manufacturers – Control Cable

A. Belden or an approved equal.

807.09.4 Control Cable

A. Description: Twisted Shielded Single Pair Cable or as indicated on drawings.
B. Conductor: Copper.
C. Insulation Voltage Rating: 300V
D. Insulation Material: Fluorinated Ethylene Propylene.

807.10 Examination

A. Verify that mechanical work likely to damage wire and cable has been completed.

807.11 Preparation

A. Completely and thoroughly swab raceway before installing wire.

807.12 Wiring Methods

A. Exterior Locations: Use only building wire type MTW, in raceway.
B. Underground Installations: Use only building wire type MTW insulation, in raceway.
C. Interior Locations: Use only building wire THHN/THWN insulation in raceway.

807.13 Installation

A. Install products in accordance with manufacturer's instructions.
B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
C. Use stranded conductors for control circuits.
D. Pull all conductors into raceway at same time.
E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
F. Clean conductor surfaces before installing lugs and connectors.
G. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

807.14 Interface with Other Products

A. Identify wire and cable under provisions of Section 810, Electrical Identification Fuel System.
B. Identify each conductor with its circuit number or other designation indicated on Drawings.

807.15 Field Quality Control

A. Inspect wire and cable for physical damage and proper connection.
B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

807.16 Basis of Payment

A. Conductors shall be incidental to the appropriate installations; 802.10, 802.20, 803.10, 804.10.

SPECIAL PROVISION

SECTION 808

ELECTRICAL CONTROLS – FUEL SYSTEM

808.01 Description

A. Emergency Stop switches.
B. Point of Sale (POS) System.
C. Intercom controller
D. Data Distribution Cabinet
E. Site Controller
F. Submersible Pump Controller
G. Leak Detection Control Panel

808.02 References

A. EMA ICS 1 - General Standards for Industrial Control Systems.
B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

808.03 SUBMITTALS

A. Submit shop drawings under provisions of Subsection 105.7.4, Submittal Requirements.
B. Submit product data for each component specified.
C. Submit manufacturer's installation instructions under provisions of Subsection 105.7.4, Submittal Requirements.
D. Submit evidence of certification as an installer of Wayne-Dresser, Veederoot and Fet-co controls.

808.04 Project Record Documents

A. Submit record documents under provisions of Subsection 105.7.4, Submittal Requirements.
B. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

808.05 Operation and Maintenance Data

A. Submit operation data under provisions of Subsection 105.7.4, Submittal Requirements.
B. Submit maintenance data under provisions of Subsection 105.7.4, Submittal Requirements.
C. Include recommended preventive maintenance procedures and materials.

808.06 Qualifications

A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years experience and certified as an installer of Wayne/Dresser, Veede-Root and Fe Petro Fuel Systems.

808.07 Products

808.07.1 Control Switches and Stations

A. Contacts: NEMA ICS 2; Form C.
B. Contact Ratings: NEMA ICS 2.
C. Emergency Stop Pushbutton Operator (EPO): NEMA ICS 2: Class 1 Division 2, Jumbo Red Mushroom head, maintained contact, manual reset. Intrinsically safe: EATON 10250T7019P or an approved equal. Provide cast aluminum Nema4X enclosure. Label EPO as follows:
   1. EPO for diesel fuel dispensers: "Diesel Pumps Emergency Power Off"
   2. EPO for gasoline/diesel fuel dispensers: "Fuel Pumps Emergency Power Off"

808.07.2 Point of Sale (POS) System

A. Per CN Brown requirements. Coordinate with Mr. Kevin Knightly, of CN Brown (kevink@cnbrown.com).

808.07.3 Intercom Controller

A. Description: Two way, hands free, intercom system controller compatible with speakers mounted in fuel dispensers.
B. Manufacturer: 3M.
C. Controller Model: 3M #78-6911-4793-4
D. Station Selector / Microphone: 3M #78-9236-6513-3
E. Provide with required accessories. Coordinate with Mr. Kevin Knightly, of CN Brown (kevink@cnbrown.com).

808.07.4 Submersible Pump Controller

A. Description: Variable speed pump controller sized for 4HP motor (max)
B. Manufacturer: FE PETRO
C. Model: magVFC

808.07.5 Data Distribution Cabinet

A. The Data Distribution Cabinet is furnished by CN Brown for installation by contractor. Coordinate with Mr. Kevin Knightly, of CN Brown (kevink@cnbrown.com).

808.07.6 Site Controller

A. The Site Controller and relay cabinet is furnished by CN Brown for installation by contractor. Coordinate with Resident and Mr. Kevin Knightly, of CN Brown (kevink@cnbrown.com).

808.07.7 Leak Detection Control Panel

A. Existing Veeder-Root #TLS-450 Plus.

808.08 Installation

A. Install devices and equipment in accordance with manufacturer's instructions.
B. Make electrical wiring interconnections and provide conduit and wire as shown on drawings.
C. Contractor shall start up the fueling system, complete in all functions as described in the manufacturer's literature. Troubleshoot and test the system to meet manufacturer's requirements. This work applies to equipment in the entire product portion of this Specification.

808.09 Basis of Payment

A. Electrical Controls shall be incidental to the appropriate installations; 802.10, 802.20, 803.10, 804.10..

SPECIAL PROVISION
SECTION 809

SECONDARY GROUNDING – FUEL SYSTEM

809.01 Description

A. Power system grounding.
B. Electrical equipment and raceway grounding and bonding.

809.02 Related Sections

A. Section 805, General Electrical Requirements.

809.03 System Description

A. Ground equipment to the electrical service system ground.
B. Bond together the equipment ground, equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables. Bond Frames of Dispensers.

809.04 Materials

A. Ground Rods: Copper-encased steel, 3/4 inch diameter, minimum length ten feet or as indicated.
B. Mechanical Connectors: Bronze "acorn" style clamps, exothermic weld kits, pipe clamp connectors, or tin plated copper lugs.
C. Grounding Bushings: Cast type with set screw and grounding lug. OZ Gedney or an approved equal.

809.05 Examination

A. Verify that final backfill and compaction has been completed before driving rod electrodes.

809.06 Installation

A. Install products in accordance with manufacturers' instructions.
B. Provide a separate, insulated equipment grounding conductor in all feeder and branch circuit raceways unless noted otherwise. Terminate each end on a grounding lug, bus, or bushing. Bond multiple runs of metal conduit entering slabs together, and connect to ground bus or terminal.
C. Use bare stranded copper wire sized as indicated on drawings.
D. Install grounding bushings on all conduits 1-1/2" and larger at entrance to pull boxes, rising up in slabs and at panelboards and switchgear. Provide equipment grounding and grounding electrode conductors in accordance with NEC 250.

809.07 Field Quality Control

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

809.08 Basis of Payment

A. Grounding and Bonding system shall be incidental to the appropriate installations; 802.10, 802.20, 803.10, 804.10.

SPECIAL PROVISION

SECTION 810

ELECTRICAL IDENTIFICATION – FUEL SYSTEM

810.01 Description

A. Nameplates and tape labels.
B. Wire and cable markers.

810.02 Related Sections

A. Section 805, General Electrical Requirements.
B. Section 806, Conduit
C. Section 807, Building Wire and Cable

810.03 Submittals

A. Submit shop drawings under provisions of Section 105.7.4.
B. Include schedule for nameplates and tape labels.

810.04 Materials

A. Nameplates: Engraved three-layer laminated melamine plastic, 0.125 inch thick, white letters on a black background.
B. Wire and Cable Markers: Cloth markers, split sleeve, or tubing type.
C. Underground Warning Tape: See section 806 – CONDUIT.
D. Cable Identification: Plastic coated self sticking markers (water proof), colored nylon cable ties and plates or heat shrink type sleeves.

810.05 Installation

A. Degrease and clean surfaces to receive nameplates.
B. Install nameplates parallel to equipment lines.
C. Secure nameplates to equipment fronts using screws, rivets, or adhesive. Secure nameplate to inside face of recessed panelboard doors in finished locations.
D. Embossed tape will not be permitted for any application.
E. Cable Identification: Apply marker tape and circuit ID number as required.

810.06 Wire Identification

A. Provide wire markers on each secondary and control conductor, at line and load connections, and junction or termination points.

810.07 Nameplate Engraving Schedule

A. Provide nameplates to identify all control equipment, and loads served. Letter Height: 1/4 inch for individual disconnect switches and loads served, 1/2 inch for distribution equipment identification.

810.08 Marker Tape

A. Identify underground conduits using detectable underground warning tape. Install one tape per trench six inches below finished grade. Also see Section 806, CONDUIT.

810.09 Basis of Payment

A. Electrical Identification shall be incidental to the appropriate installations; 802.10, 802.20, 803.10, 804.10..

SPECIAL PROVISION

SECTION 811

TRANSIENT VOLTAGE SURGE SUPPRESSION – FUEL SYSTEM

811.01 Description

A. These specifications describe the electrical and mechanical requirements for a hybrid, high energy, suppression filter system that integrates transient voltage surge suppression (TVSS) with high frequency electrical line noise filtering for high exposure applications.
B. The specified unit shall provide effective high energy transient voltage suppression, surge current diversion, and noise attenuation for all electrical modes of equipment connected downstream from the facilities meter or main over current device in high exposure.
C. The unit shall be designed and manufactured in the USA by a qualified manufacturer of surge suppression equipment. The qualified manufacturer shall have been engaged in the commercial design and manufacture of such products for a minimum of ten (10) years.
D. Provide TVSS for all fuel system power and control output/input circuits leaving the building and terminating at the site equipment, including submersible pump controllers, data systems, 120V and 208V power, intercom equipment and fire alarm circuits.

811.02 Standards

The specified unit shall be designed, manufactured, tested and installed in compliance with the following standards:

A. ANSI/IEEE C62.41-1991 category C environments.
B. ANSI/IEEE C62.33 Standard Test Specifications for Varistor Protection Devices
C. ANSI/IEEE C62.35 Standard Test Specifications for Avalanche Semiconductor Protection Devices.
D. ANSI/IEEE C62.41-1991 Recommended practice on Surge Voltages in Low Voltage AC Power Circuits.
E. ANSI/IEEE C62.45-1987 Guide on Surge Testing for Equipment Connected to Low Voltage AC Power Circuits.
F. UL -96 Standard for Safety lighting Protection components.
G. UL -1283 Standard for Safety - Electromagnetic Interference Filters.
H. UL -1449, 2nd Edition Standard for Safety - Transient Voltage Surge Suppressors.
I. NFPA 70 National Electrical Code.
J. NFPA 75 Standard for the Protection Electronic Computer Systems.
K. NFPA 780 Standard for the Installation of Lightning Protection Systems.
L. Military Standard (Mil Std) 220A.
M. Canadian Standards Association (CSA).
N. Federal Information Processing Standards Publication.
O. 94 (FIPS PUB 94) CCITT National Electrical Manufacturers.

Association;(NEMA LS1-1992 Guidelines) Low Voltage Surge Protection Devices

811.03 Environmental Requirements

A. Storage Temperature: Storage temperature range shall be -40° to +85° C (40° to +185° F).
B. Operating Temperature: Operating temp range shall be -40° to +60°C (-40° to+140° F).
C. Relative Humidity: Unit shall be operable within 0% to 95% Non-condensing relative humidity.
D. Operating Altitude: The unit shall be capable of operation in altitudes up to 12,000 feet (3,658 meters) above sea level.
E. Audible Noise: The unit shall not generate any audible noise.
F. Magnetic Fields: No appreciable magnetic fields shall be generated. Unit shall be capable of use directly in computer rooms in any location without danger to data storage systems or devices.

811.04 System Description

A. Transient voltage surge suppressor (TVSS) or Surge protection devices are the equipment required for the protection, within specified limits, of AC electrical circuits and electronic equipment from the effects of lightning induced voltages, external switching transients and internally generated switching transients. Individual suppressors shall be installed where shown on the drawings or indicated in the Specifications.

811.05 Unit Operating Voltage

A. The nominal unit operating voltage and configuration shall be as indicated on the drawings.

811.06 Submittals

A. Submit in accordance with Section 105.7.4 – Submittal Requirements.
B. Submit installation details for all suppressors demonstrating mechanical and electrical connections to equipment being protected.
C. Submit specific test data for actual method of installation proposed. Interpretation of standard manufacturers published data will not be accepted unless the data coincides with the actual installation procedure.
D. Submittals shall include, but are not limited to, the following data:

1. Complete data for each suppressor type indicating conductor sizes, types, connection configuration lead lengths and all appropriate dimensions.
2. Dimensions for each suppressor type indicating mounting dimensions and required accessory hardware.
3. Certified test data from an independent testing laboratory indicating the ability of the product to meet or exceed all requirements of this specification.

4. Drawings shall be provided indicating suppressor mounting and lead length configuration and mounting of remote diagnostic equipment and assemblies.
5. List and detail all protection systems such as fuses, disconnecting and protective materials.
6. Listing to UL 1449, 2nd Edition and include UL 1449 2nd Edition listing/classification page verifying UL clamping voltage stated on catalog data.
7. Conformance to appropriate referenced standards and publications listed in section 1.02.
8. The submittal shall include a listed comparison and proof of compliance with each paragraph of these Specifications.

E. Submitted suppressors shall be equal to or better than the characteristics specified herein.

F. Electrical performance data shall be provided on form A included at the end of this section.

811.07 Quality Assurance

A. Surge suppression, grounding and bonding shall effectively protect within tested limits, the systems to which applied against lightning transients, internal and external switching transients, and other surge transients throughout the useful life of the system.
B. Any SPD which shows evidence of failure or incorrect operation during the ten year warranty shall be replaced or repaired at no expense to the Owner with exception of fair labor costs. Since Acts of nature or similar statements include the lightning threat to which this SPD shall be exposed, any such general limiting warranty responsibility in the general conditions of this specification shall not apply to this section.
C. Installation of SPD in or on electrical or electronic systems shall in no way compromise or violate equipment listing, function or warranty of the distribution equipment.
D. All SPD's and supporting components shall be guaranteed by the installing Contractor to be free of defects in material and workmanship for a period of ten (10) years from the date of completion for the system to which the SPD is attached.

811.08 Qualifications

A. Manufacturer: Company specializing in surge suppression equipment of the type herein specified with a minimum of ten (10) years documented experience.
B. Installer: Installation shall be by the manufacturer or a duly licensed electrical Contractor.

811.09 Field Measurements

A. Verify that field measurements are as indicated on shop drawings.

811.10 Coordination

A. Coordinate work with electrical installations.

811.11 Products

811.11.1 Manufacturers

A. The intent of this specification is to allow manufacturers with similar equipment utilizing silicon avalanche diode (SAD) or metal oxide varistor (MOV) technology to provide transient voltage surge suppression within the guidelines set forth herein.

B. The SPD manufacturer shall offer factory service and replacement for all units. The manufacturer shall provide this service within ten (10) working days, and provide replacement components shipped to the Owner within the allocated response time.

C. Single source of supply. All AC power SPD's shall be manufactured by a single manufacturer. Acceptable manufacturers: Square D United, Ditek Power or approved equal for distribution or sub-panels. All electronic system suppressors shall be manufactured by a single manufacturer. Manufacturers listed herein have demonstrated that they can provide equipment that meets or exceeds all requirements, however other manufacturers demonstrating compliance of specifications contained herein will also be considered.

811.11.2 Components

A. Distribution equipment suppressors: The AC voltage SPD's shall be a high speed, high current device designed to protect electrical systems and electronic equipment from transient over-voltage. The SPD shall provide continuous bi-polar, bi-directional, non-interrupting protection and be capable of instant reset with no degradation in protection. Gas tubes are not acceptable. The SPD shall utilize SAD or MOV technology. It shall start to suppress at a minimum of 115% of the peak voltage of the sine wave. At maximum surge current dissipation, the device shall not exceed the maximum voltage protection level. The SPD shall be installed in parallel with the service main disconnect, distribution or branch panel main lugs as shown. Connect SPD to over current protection sized as shown with an AIC rating equal to panel rating. The suppressor shall have status indicator lights, dry contacts with remote alarm capabilities and an audible alarm. Suppressors shall be assembled as modular units to permit quick, easy replacement of failed components.

1. Electrical Service
   a. Voltage 208.
   b. Frequency 60 Hz
   c. Phases -- 3 phase
   d. Wiring configuration -- as indicated
2. IEEE 62.41 Categories unless otherwise indicated on drawings:
   Service entrance sizes < 600A B3/C1
   > 600A to 1.2 KA C2

> 1.2 KA C3
Distribution or sub-panels B2

3. Electrical Performance
   Response time < 5 nanoseconds
   MCOV 115% minimum
   Shortwave test- surge current
   (6kv, 1.2/50usec; 3ka 8/20µsec) 5000 surges
4. Minimum surge current:
   a. Service Entrance 410,000 Amps/Phase
   b. Distribution and Sub-panels 210,000 Amps/Phase
5. Suppression system protected modes shall be L-N, L-G, N-G for Wye Systems and L-L, L-G for ungrounded Delta Systems.
6. Power on indicators and failure detection: A lighted panel on the cover shall provide indication that the suppressor is properly activated and shall also indicate mode failure. If the suppressor fails, an isolated contact shall close. In addition, an audible alarm shall be provided with manual reset.
7. Failure mode - SPD's shall be designed to fail shorted. Any fuses in series with the SPD's shall not open during a surge event.

B. Bonding and Grounding Conductors and Materials for Panelboard Suppressors:

1. Size: Conductors utilized for surge suppressor connections to feeder conductors shall be a minimum of #6 AWG stranded insulated copper unless otherwise specified.
2. Bus: Ground bus or strip material where used shall be copper, a minimum of 1/4 inch thickness and two inches wide unless otherwise specified. Bus materials shall be secured to surfaces with appropriate insulators and mechanical fasteners. Bus connections shall be bolted and reinforced as necessary to provide a permanent and secure connection.
3. Connections Compliance: Connectors, splices, and other fitting used to interconnect grounding conductors, bonding to equipment or ground bars, shall comply with requirements of the National Electric Code and be accepted by Underwriters' Laboratories for the purpose.
4. Connectors: Connectors and fitting for grounding and bonding conductors shall be of the compression type in above grade locations. Connections below grade shall be exothermically welded.
5. Dissimilar Materials: Bonding connections between electrically dissimilar metals shall be made using exothermic welds or using bi-metal connectors designed to prevent galvanic corrosion.

C. Communication Lines: The following standard for separately mounted telephone and signal line suppressors shall apply. All protectors shall be securely mounted at protected equipment location. All suppressors shall provide common (L-G) mode protection on all lines. Suppressors shall be tested in accordance with IEEE C62.36-1994 as a minimum. Protective interfacing with the telephone wire pairs shall be listed to UL 497A.

D. Data Line Protection: Solid state, silicon avalanche diode or metal oxide varistor circuitry for protection from over voltages on long cable runs employing standard

RS-232, RS422, or RS485. Appropriate connectors shall be utilized to interface a remote station with a host CPU.

811.12 System Equipment Specifications

811.12.1 Telephone and Intercom Systems

A. Suppressors shall be installed on the AC power at the point of service and shall meet the following criteria:

1. UL 1449 Listed
2. UL 1449 S.V.R. of 330 Volts
3. Diagnostic Indicator Lights
4. Integrated ground terminating post (where case/chassis ground exists)
5. Surge Capacity of 19,000 amps (8 x 20 µSec)
6. Joule Rating of 210 joules (10 x 1000 µSec)
7. Lifetime Warranty
8. Acceptable Manufacturer: DiTek, or an approved equal.

B. Suppressors shall be installed on all telephone/intercom circuits that enter or leave buildings and shall meet the following criteria:

1. UL 497A Listed (where applicable)
2. UL 497B Listed (horns, strobes, speakers or communication circuits over 300 feet)
3. Multi Stage protection design
4. Auto-reset over-current protection not to exceed 125 milliamps
5. Surge Current of 1000 amps per pair (8 x 20 µSec)
6. Joule Rating of 14 joules per pair (10 x 1000 µSec)
7. Lifetime Warranty
8. Acceptable Manufacturer: DiTek, or approved equal.

811.12.2 Fire Alarm Systems

A. Suppressors shall be installed on the incoming AC Power Fire Alarm Panel and meet the following criteria:

1. Parallel connected
2. Suppression between L-N, L-G and N-G
3. Surge Capacity: 22,500 Amps (8x20 µSec)
4. Diagnostic indicator lights
5. UL 1449 Listed
6. Lifetime Warranty
7. Acceptable Manufacturer: DiTek, or approved equal.

B. Suppressors shall be installed on all Telephone Communication Interface (one unit per phone line) and meet the following criteria:

1. UL 497A Listed
2. Multi Stage protection design
3. Surge Capacity: 9000 Amps/pair (8x20 µSec)
4. Joule rating: 76 Joules per pair (10x1000 µSec)
5. Clamp Voltage: 130VAC
6. Auto Reset Current Protection not to exceed 125 milliamps
7. Lifetime Warranty
8. Acceptable Manufacturer: DiTek, or approved equal.

C. Suppressors shall be installed on all fire alarm initiating and signaling loops and addressable data circuits which enter or leave buildings and shall meet the following criteria:

1. UL 497A for RS485/422 data communications or UL 497B for initiating/notifying circuits.
2. Fail-short/fail-safe mode.
3. Surge capacity: 2000 amps per pair (8x20 µSec)
4. Clamp Voltage: 30 VAC (zones)- 6VAC (Data)
5. Joule Rating: 34 Joules per pair (10x1000 µSec)
6. Auto-reset current protection not to exceed 125 milliamps for UL-497A devices.
7. Lifetime Warranty
8. Acceptable Manufacturer: DiTek - for UL 497A for data circuits, for initiating and signaling loop circuits, or approved equal.

811.12.3 Computer / Data Systems

A. Suppressors shall be installed on AC power at the point of service and shall meet the following criteria:

1. UL 1449 Listed
2. UL 1449 S.V.R of 330 Volts
3. Status Indicator Lights
4. 15 amp circuit breaker
5. Surge Capacity of 27,000 amps (8 x 20 µSec)
6. Joule Rating of 210 joules (10 x 1000 µSec)
7. Minimum of 7 foot cord
8. Lifetime Warranty
9. Acceptable Manufacturer: DiTek, or approved equal.

B. Suppressors shall be installed on all computer/data circuits on points of entry and exit from separate buildings and shall meet the following criteria:

1. All pins must be protected
2. Must be Category 3 & 5
3. Maximum capacitance of 50pf.
4. EIA/TIA 568.
5. Surge capacity: 112 amps per pair (8x20 µSec)

6. Near end cross talk - 44db
7. Attenuation - 0.6 db
8. Insertion loss - <0.5db
9. Lifetime Warranty
10. Acceptable Manufacturer: DiTek, or approved equal.

811.12.4 Electrical Equipment

A. Suppressors shall be installed at the point of AC service to the electronic equipment and meet the following criteria:

1. Must have 3 AC outlets capable of handling 15amps.
2. Surge Capacity: 39,000 amps (8 x 20 µSec)
3. Joule Rating: 420 joules (10 x 1000 µSec)
4. All mode protection: L-N, L-G, N-G
5. EMI/RFI Filtering
6. UL 1449 S.V.R. of 330 Volts
7. Diagnostic Indicator Lights
8. Lifetime Warranty
9. Acceptable Manufacturer: DiTek or an approved equal.

811.12.5 120V/208V Field Equipment

A. Provide protection as follows for power to pumps, dispensers, canopies and kiosk: Joslyn Transend or an approved equal.
B. Suppressors shall be installed on equipment at building exterior.

1. UL 1449
2. UL 1283
3. Surge Capacity 80,000 amperes per mode – 160,000 amperes per phase.
4. 120% MCOV.
5. LED status indication.
6. Approximate enclosure size 7’ x 7’ x 5” D.
7. Provide 2, 3, or 4 wire ground to match load device

811.13 Installation

811.13.1 Distribution Equipment Surge Suppressors

A. Suppressors shall be installed at Service Entrance switchboards and distribution equipment where shown as close as practical to equipment to be protected consistent with the available space. Where installation space permits and where no code restrictions apply, suppressors may be installed within protected equipment. Suppressors installed in this manner shall utilize the equipment ground bus or enclosure as a medium for bonding of their ground terminals. Bonding jumpers not exceeding twelve inches in length shall be installed between the ground bus or enclosure and suppressor ground terminals. Bolted connections with star washers shall be used to insure electrical and mechanical integrity of connections to the

ground bus or enclosure. Remove paint where connections are made to the enclosure. Conductors from suppressors shall attach to main service bus in the entrance equipment on the load side of any electrical metering equipment.

B. Suppressors shall be installed in a neat, workmanlike manner. Lead dress shall be consistent with recommended industry practices for the system on which these devices are installed.

C. All system wiring shall be classified into protected and non-protected categories wiring on the exposed side of suppression devices shall be considered unprotected. Surge suppressor grounding and bonding conductors shall also fall into this category.

D. All wiring between surge suppressors and protected equipment shall be considered protected and connected in accordance with the latest edition of the NEC.

E. A minimum of three inches of separation shall be provided between parallel runs of protected and unprotected wiring in control panels, terminal cabinets, terminal boards and other locations. In no case shall protected and unprotected wiring be bundled together or routed through the same conduit. Where bundles of protected and unprotected wiring cross, such crossings shall be made at right angles.

811.14 Low Voltage and Comm/Data Equipment Surge Suppressors

A. Install TVSS equipment according to manufacturer's recommendations.

B. All electronic equipment/systems utilizing cord, plug or hardwired connectors shall be bonded to the building electrical system ground, building frame or driven ground rod and shall be provided with a multi-stage suppression system.

C. Contractor must properly match TVSS equipment to equipment being protected, including wire sizes, operating voltages, currents and number of conductors.

D. Contractor must coordinate with providers of all equipment being protected and provide TVSS equipment which meets these specifications.

E. Suppressors shall be installed as close as practical to the electrical distribution panel to be protected, consistent with available space.

F. Suppressors shall be installed in a neat manner. All hardwired low-voltage circuit lead lengths(conductor/wire distance) shall be as short as possible while making certain that referenced ground connections are of a lesser distance (conductor/wire length) than that of the suppressor to the protected equipment.

G. Equipment shall be installed following manufacturer's recommendations and guide-lines in compliance with NEC Article 280/250 for grounding and bonding; and NEC Article 110-9 and 110-10 for over-current protection.

H. Provide required enclosures (indoor or outdoor) for protectors either adjacent to each electronic system supplier to provide cabinet large enough to include mounting protectors within system cabinet.

811.15 Quality Control

A. Disconnect suppressor prior to testing of service entrance distribution equipment and panel boards.

B. Supply certified test reports for all tested parts, elements and/or systems or where required by the Owner to substantiate published ratings of claims.

C. Have the grounding system tested by an independent testing firm using the Fall of Potential or three point test with no current, if possible, on the system. Conform with

IEEE STD 81-1983. If the system does not test below 10 (ten) ohms, notify the Resident immediately.

811.16 Basis of Payment

A. Transient voltage surge suppression (TVSS) system components shall be paid for under the following pay item numbers:

Payment will be incidental to the appropriate installations; 802.10, 802.20, 803.10, 804.10.

SPECIAL PROVISION

SECTION 832

SITE BOLLARDS

832.01 Description

This work shall consist of furnishing and installing Type A Steel Site Bollards consisting of a cast in place concrete base, 6" schedule 80 concrete-filled galvanized steel pipe, and plastic yellow sleeve in accordance with these specifications, and as shown on the Plans.

Shop drawings for the site bollards shall be completed, submitted to, and accepted by the Resident prior to any work being completed relative to this section.

832.02 Materials

Concrete shall be Class "A" concrete and shall meet the requirements of Section 502. Yellow sleeves are available from the sources noted on the plans or an approved equal.

832.03 Method of Measurement

Type A Steel Site Bollard will be measured for payment by each unit satisfactorily constructed, installed, and accepted. Excavation and concrete will not be measured for payment but shall be incidental to the work under this item.

832.04 Basis of Payment

All work under Section 832.41, Type A Steel Site Bollard, shall be paid for at the contract unit price per each, which shall be full compensation for all materials, labor, and incidentals required to complete the work.

Payment will be made under:

Pay Item		Pay Unit
832.41	Type A Steel Site Bollard	Each

COVER SHEET
STANDARD OPERATING PROCEDURE

Operation Title: **Managing Non-Hazardous Petroleum Contaminated Ground Water and Soil at UST Sites**

Originator: **Kelly Perkins**
Quality Assurance Coordinator
Division of Technical Services
Bureau of Remediation and Waste Management

APPROVALS:

Division of Technical Services Director:

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Susanne Miller		Sep 7, 2021
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QMSC Chair:

Bill Longfellow	Bill Longfellow Bill Longfellow (Sep 7, 2021 13:35 EDT)	Sep 7, 2021
Print name	*Signature*	*Date*

Department Commissioner:

Melanie Loyzim		Sep 8, 2021
Print name	*Signature*	*Date*

DISTRIBUTION;

( ) Division of Technical Services……...By:_____Date:_____
( ) Division of Response Services……...By:_____Date:_____

1.0 APPLICABILITY

This Standard Operating Procedure (SOP) applies to projects in the Maine Department of Environmental Protection's (MEDEP) Bureau of Remediation and Waste Management (BRWM) contaminated with non-hazardous petroleum products. It is recommended for use by all parties that investigate, mitigate, or remediate petroleum releases.

The on-site or off-site beneficial use of virgin petroleum contaminated soil from Department supervised remedial activities is exempt from the licensing requirements of *Beneficial Use of Solid Wastes*, 06-096 C.M.R. ch. 418 (last revised July 8, 2018), under the terms of §3(O) and §3(R) when the project is conducted in conformance with all applicable provisions of this SOP. (http://www.maine.gov/sos/cec/rules/06/096/096c418.docx).

This SOP is not a rule and is not intended to have the force of law, nor does it create or affect any legal rights of any individual, all of which are determined by applicable statutes and rules. This SOP does not supersede statutes or rules.

2.0 PURPOSE

The purpose of this document is to describe the MEDEP/BRWM procedures for managing ground water and soil primarily at underground storage tank (UST) facilities that have suffered the release of non-hazardous petroleum products. The procedures may be applied in other situations, such as aboveground storage tank facilities and home heating oil spills, where non-hazardous petroleum is the only contaminant. This SOP describes procedures used over short term periods, typically less than 30 days.

Reporting requirements for UST sites are outlined in *Rules for Underground Oil Storage* Facilities, 06-096 C.M.R. ch. 691 (effective date September 16, 1991, amended September 26, 2018-filing 2018-205).

3.0 RESPONSIBILITIES

All MEDEP/BRWM Staff must follow this procedure when managing a UST removal. All Managers and Supervisors are responsible for ensuring that their staff are familiar with and adhere to this procedure. MEDEP/BRWM staff reviewing data by outside parties are responsible for determining if the procedure (or an approved equivalent) was utilized appropriately.

The project leader for a petroleum release site is responsible for:

1. Developing a conceptual site model (CSM) and ascertaining the site's history and current use for MEDEP review and approval at non-MDEP lead sites.
2. Developing media specific remediation goals for MEDEP's review and approval at non-MDEP lead sites that are consistent with the Remedial Action Guidelines (RAGs) and CSM.

3. Establishing and maintaining communications with the:
    a. UST facility owner/operator
    b. Certified tank installer
    c. General contractor (excavator)
    d. Consultant
    e. MEDEP staff who have been assigned to the project from the Response Division; Technical Services Division; Petroleum Management Division; and the Collection, Claims and Recovery Unit.
    f. Landowners
    g. Waste receiving facilities

Utilizing the CSM, professional judgement, and good communications the project leader can choose to leave ground water or soil at the site or follow the procedures of this SOP to treat, dispose, and/or beneficially use it.

4.0 DEFINITIONS and ACRONYMS

4.1 Approved Facility – An in-state facility licensed by the MEDEP or out-of-state facility with similar approvals that accepts petroleum contaminated ground water or soil. Examples include Publicly Owned Wastewater Treatment Plants, Sanitary Sewer Districts, Special Waste Landfills, Soil Processing Facilities.

4.2 Contaminant of Concern (COC) - A contaminant that has been released at a site and risk evaluation indicates that mitigation or remediation is necessary to prevent exposure to the contaminant.

4.3 Compliance and Technical Assistance Unit – The Compliance and Technical Assistance Unit within Bureau of Water Quality, Division of Water Quality Management is composed of wastewater inspectors and engineers responsible for reviewing compliance at wastewater pretreatment facilities and POTW's.

4.4 Construction Fill – As defined in *Maine Solid Waste Management Rules, General Provisions* 06-096 C.M.R. ch. 400 (last revised April 6, 2015): , "Construction fill" means fill that may contain solid waste utilized to provide material for construction projects such as roads, parking lots, buildings or other structures. It does not include fill needed to re-contour an area within a landfill or where no further construction is occurring. If the construction fill contains solid waste other than inert fill, the use of the fill is regulated under 06-096 C.M.R. ch418.

4.5 Dewater - The process of lowering the ground water elevation in an excavated area that is flooded with rainwater or ground water.

4.6 Extractable petroleum hydrocarbons (EPH) - Massachusetts Department of Environmental Protection's Method for the Determination of Extractable Petroleum Hydrocarbons (EPH). https://www.mass.gov/files/documents/2017/12/21/MassDEP%20EPH%20Method%20-%20May%202004%20v1.1.pdf

4.7 Granular Activated Carbon (GAC) - A filter media used to remove dissolved organic and inorganic contaminants from water and remove volatile organics from air to reduce emissions and control indoor air odors. GAC is a form of processed carbon designed to have small, micropores to increase surface areas available for adsorption or chemical reactions. GAC is made from raw organic carbonaceous materials such as coconut shells, nut shells, peat, wood, or coal.

4.8 Inert Fill – As defined in 096 C.M.R. ch. 400, “Inert fill” is clean soil material, including soil from road ditching and sand from winter sand cleanup; rock; bricks; crushed clean glass or porcelain; aged, fully-hardened asphalt; and cured concrete; that are not mixed with other solid or liquid waste, and are not derived from an ore mining activity.

4.9 Leaded Fuels – Fuels that contain lead and lead scavengers. Gasoline known to have been manufactured before 1979 is presumed to be leaded. According to Maine Chapter 691 Rule for Underground Oil Storage Facilities, lead was prohibited in gasoline as of January 1, 1996. Facilities operating prior to 1996 will need to determine the presence or absence of lead and lead scavengers. Lead continues to be used in high octane fuel and certain aviation fuel.

4.10 Light Non-aqueous Phase Liquid (LNAPL) - A liquid having a specific gravity less than one and is composed of one or more organic compounds that are immiscible or sparingly soluble in water and is observable to be separate from water. The term encompasses all potential occurrences of LNAPL including free, residual, mobile, entrapped, and visible petroleum sheen.

4.11 Oil – As defined in *Oil Discharge Prevention and Pollution Control,* 38 M.R.S. §542(6) (2021), “Oil” means petroleum products and their by-products of any kind and in any form including but not limited to, petroleum, fuel oil, oil refuse, oil mixed with other wastes, crude oils and all other liquid hydrocarbons regardless of specific gravity. Oil does not include liquid natural gas.

4.12 Petroleum Contaminated Soil – As defined in 06-096 C.M.R ch 418, “Petroleum contaminated soil” means soil that has been verified through sampling and analysis, and site-specific documentation provided by the generator, to have been contaminated by a discharge/release of petroleum. Petroleum contaminated soil may include soil with naturally occurring concentrations of chemicals (e.g. arsenic); and petroleum additives (e.g. ethanol) except for lead.

4.13 POTW – Publicly owned treatment works. POTW’s can be municipal wastewater treatment plants, sanitary districts, or sewer districts.

4.14 Protected Natural Resource – As defined by *Natural Resources Protection Act* 38 M.R.S. § 480-B (8) (2007), protected natural resouece means coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands,

community public water system primary protection areas, great ponds or rivers, streams or brooks, as these terms are defined in 38 M.R.S. § 480-B.

4.15 Site-specific Remedial Action Guidelines – As defined in the MEDEP Remedial Action Guidelines include:

- Statewide Ground Water & Drinking Water Remediation Guidelines for Petroleum Related Compounds
- Soil Remediation Guidelines Based on Petroleum Leaching to Ground Water
- Soil Remediation Guidelines for Petroleum Target Compounds and Hydrocarbon Fractions
    - Applicable human exposure scenarios:
        - Residential
        - Recreational/park user
        - Outdoor commercial/industrial worker
        - Construction/excavation worker

4.16 Surplus soil – Soil removed from its original location and cannot be re-used on site. Surplus soil known or presumed to be petroleum contaminated can be managed in accordance with this document.

4.17 Underground Storage Tank (UST) - Any container, 10 percent or more of its volume being beneath the surface of the ground and which is used, or intended to be used, for the storage, use, treatment, collection, capture or supply of oil, but does not include any tanks situated in an underground area if these tanks or containers are situated upon or above the surface of a floor and in such a manner that they may be readily inspected. Does not include underground propane storage tanks, wastewater treatment tank systems such as underground oil water separators that are regulated by the Clean Water Act §§ 402 or 307(b) (1972) (33 U.S.C., §1317(b) or §1342 (2016)), storm water and emergency catch basins, and equipment or machinery tanks such as hydraulic lift tanks and electrical equipment tanks. Overflow tanks associated with oil-water separators are still considered an underground oil storage tank.

4.18 Virgin Petroleum Contaminated Soil – Soil that is contaminated with unused refined petroleum oil.

4.19 Volatile petroleum hydrocarbons (VPH) - Massachusetts Department of Environmental Protection's Method for the Determination of Volatile Petroleum Hydrocarbons (VPH) https://www.mass.gov/files/documents/2018/02/23/VPH%20GC%20PIDFID_Revision%202_1_February%202018.pdf

5.0 GUIDELINES AND PROCEDURES

5.1 INTRODUCTION

When a UST facility owner removes, replaces, or repairs the facility, petroleum contaminated ground water or soil may be generated. The UST facility owner is obligated to manage the treatment or disposal of the petroleum contaminated groundwater and soil to ensure protection of human health and the environment. This SOP provides a process for meeting those obligations. Where ground water needs to be removed from the excavation or when soil cannot be returned to its original location or an acceptable on-site location approved by MEDEP; this SOP should be followed if the UST facility owner intends to qualify for exemption from the licensing requirements of 06-096 C.M.R. ch. 418 for soil or treat groundwater removed from the excavation and discharge to the ground or to a sanitary sewer collection system. Following this SOP requires Department staff from BRWM, Division of Petroleum Management or Division of Technical Services direction and supervision when handling soils and groundwater during the UST removal/replacement. The direction and supervision by Department staff will be addressed during the 10-Day notification period in accordance with 06-096 C.M.R. ch. 691 §4.

It is the responsibility of the UST owner to provide the information needed to follow this SOP to Department staff directing the remedial activities as provided in Section 5.2 below. The information can be provided to Department staff prior to or at the beginning of the 10-day notification period. Proper planning is necessary to manage the contaminated media so that all parties involved in the excavation, transport, processing, receiving and disposal are prepared to follow the Department approved plan.. Failure to provide the information will result in the need for the UST facility owner to handle the soil and groundwater as contaminated media requiring proper testing and disposal at a licensed facility. This may impact reimbursements from the Fund Insurance Program, in accordance with RWM-PP-005. Therefore, it is important to include the Collections, Claims, and Recovery Unit in the planning discussions.

When dewatering at a UST site is necessary, the procedures of this SOP, can be used to determine the appropriate management and discharge options for each site including : 1) management of liquids for off-site disposal; 2) filter and discharge treated water on-site; 3) filter and discharge treated water to an approved sanitary sewer collection system; or 4) if the water meets the requirements for direct discharge to an approved sanitary sewer collection system. UST facilities intending to use this SOP for managing water from a UST excavation need to have an approved work plan prior to the starting the removal activities at the UST site.

UST replacement projects may generate surplus soil that cannot be stockpiled or re-used on-site and needs to be moved off-site. This SOP can be used to beneficially use surplus soil off-site as Construction Fill or dispose of the surplus soil at an approved facility.

Alternatively, a site-specific environmental media management plan may be approved by MEDEP as an alternative to the options described below.

5.2 PLANNING

Proper planning and effective communication are the keys to successfully managing surplus soil and groundwater at a UST replacement site. Planning needs to include Department BRWM staff, the UST facility owner/operator, certified tank installer, general contractor (excavator), consultant, landowner, and waste receiving facilities to assure consistency with 06-096 C.M.R. ch. 418 for soils, and compliance with the provisions of this SOP. Proper planning and communication will expedite the project and facilitate the MEDEP's timely review of requests for reimbursement of clean-up costs eligible for coverage under the State's Ground Water and Surface Water Clean-up and Response Fund. Proper planning includes the following elements:
:

1. Requesting a pre-construction meeting with the UST facility owner/operator, certified tank installer, general contractor or consultant, and MEDEP.
2. Developing a Conceptual Site Model (SOP RWM-PP-006) which considers receptors, site history, and current use.
3. Establishing appropriate guidelines for soil and groundwater based on the CSM.
4. Summarizing existing site data and notification levels for UST sites as explained in SOP RWM-PP-004 and 06-096 C.M.R. ch. 691,, Appendix Q 1(B) and 2.
5. Requesting an Oil Spill Debris Form from the MEDEP Response Division as appropriate.
6. Choosing the option(s) for ground water discharge or treatment (see Section 5.3 of this SOP). Specifically:
    a. Estimate the volume of ground water to be discharged or treated.
    b. Obtain the necessary approvals or permits from the receiving Wastewater Treatment Facility.
    c. Notify the Compliance and Technical Assistance Unit.
7. Estimating the volumes of soil to be temporarily stockpiled, transported off-site as "Construction Fill," or disposed at an approved facility. Specifically:
    a. Identify the location and containment measures for temporary on-site or off-site soil stockpiles. (See Appendix B.)
    b. Obtain the necessary approvals or permits from the landowner of the temporary off-site stockpile location.
    c. Describe the proposed sampling intervals and analysis of Slightly Contaminated Surplus Soils. (See Section 5.4 of this SOP and Appendix B.)
    d. Identify the off-site location for surplus soil determined to be "Construction Fill" and obtain the necessary approvals or permits from the landowner receiving it.
    e. Obtain approval from the MEDEP that the surplus soil being transported off-site meets the requirements of "Construction Fill" and its intended location is appropriate.
    f. Provide the name of the approved facility that will accept soil that exceeds the criteria outlined in Section 5.4 of this SOP.
8. Providing the appropriate erosion and sediment control measures in accordance with the Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014.

When plans include possible discharge of water from the excavation, BRWM staff need to notify one or more of the following entities prior to approving the plan:

1) MEDEP's Bureau of Water Quality Compliance and Technical Assistance Unit and Wastewater Licensing Unit; and the affected Municipal or District Wastewater Treatment Facility
2) The MEDEP Regional Wastewater Compliance Manager for any discharge to a POTW.
3) MEDEP Wastewater Licensing Unit Manager for surface discharge permits.

All data and other information gathered during the project should be included in the written report required by 06-096 C.M.R. ch. 691, Appendix P to be submitted to the MEDEP at the conclusion of the project. Additionally, laboratory results should be submitted to the MEDEP as Electronic Data Deliverables (EDD) in MEDEP-approved format.

5.3. GROUND WATER – Discharge Options and Minimum Treatment Standards

Groundwater discharge options can only be selected if the proper planning steps in Section 5.2 are completed and approvals from MEDEP BRWM staff have been provided in writing.

OPTION 1: Off-site Disposal

Water from a UST excavation can be pumped into a fractionation (frac) tank or a vac-truck. All LNAPL and petroleum contaminated water must be transported to an approved facility licensed to accept the waste (e.g. POTW, Centralized Waste Treatment Facility) after approval is received from the facility. Requirements for sampling, analysis, characterization, and manifesting of the material will be dictated by the licenses of the transporter and approved receiving facility. The MEDEP Regional Wastewater Compliance Manager must be notified prior to transport to a POTW.

OPTION 2: On-site Treatment and Discharge to the Ground

The petroleum contaminated water must be determined by laboratory analysis to be suitable for discharge on-site with approvals from MEDEP BRWM and the Wastewater Licensing Unit Manager.

Petroleum contaminated water may be discharged on-site, if the following conditions have been met.

- The baseline filtration system and monitoring protocol described in Appendix A of this SOP must be used or an alternative system may be approved by the MEDEP Technical Services Division.
- Petroleum contaminants are treated below the State-wide Ground Water Guidelines for Petroleum Related Compounds, before infiltration into the ground.
- There will be no discharge of treated water to a surface water body or protected natural resource.

- Erosion and sedimentation control measures must be in place to protect the hydrocarbon filtration system and prevent erosion or siltation from the discharge. (The Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014 contains best practices for dewatering excavations and types of sediment controls.)
- The ground is not frozen.

Option 3: On-site Treatment and Discharge to a Sanitary Sewer Collection System
The petroleum contaminated water must be determined by laboratory analysis to be suitable for discharge to the collection system with approvals from the MEDEP BRWM and the approved facility receiving the wastewater. Notify the MEDEP Regional Compliance Manager.

Petroleum contaminated water may be discharged directly into the sanitary sewer collection system, if the following conditions have been met.

- Petroleum contaminants meet the requirements of the approved facility receiving the wastewater through the sanitary sewer collection system.
- There will be no discharge of treated water to a surface water body or protected natural resource.

5.4 SOIL – Field Screening Criteria, Analytical Methods, and Re-use or Disposal Options

Soil being evaluated for on-site or off-site use should be field screened in accordance with SOP RWM-PP-004 Compendium of Field Testing of Soil Samples for Gasoline and Fuel Oil (TS-004). When a photo ionization detector (PID) is used, detectable results should be evaluated against the Leaching to Ground Water Field Cleanup and Notification Guidelines found in Table 1 of TS-004 for the instrument being used. Diesel, fuel oil, and kerosene contaminated soil can be field-tested with the oleophilic dye test and interpreted as outlined in Section 8.4 of TS-004. The possible result will be “Saturated”, “Positive”, “Slightly Positive”, or “Undetected”.

If laboratory analysis of soil is necessary, using the EPH or VPH analytical methods depends on the petroleum product and age of contamination. See Appendix B of this SOP for recommendations.

Table 1 summarizes the Field Screening Criteria, Analytical Methods, and Re-use or Disposal Options.

Table 1: Field Screening Criteria, Analytical Methods, and Re-use or Disposal Options

Surplus soil is considered:	When:	The soil can be:	
Minimally contaminated	There is no visual or olfactory evidence of petroleum contamination; and The bag-headspace measurements, for gasoline contamination, have PID readings less than 10 parts per million (PPM); or The oleophilic dye test result, for fuel oil contamination, is "Undetected".	Used off-site only as "Construction Fill".	
Slightly contaminated	Has visual or olfactory evidence of petroleum contamination; and The bag-headspace measurements, for gasoline contamination, have PID readings between 10 PPM and the Leaching to Ground Water Field Cleanup Guideline; or The oleophilic dye test result, for fuel oil contamination, is "Slightly Positive".	Disposed at an approved facility (e.g. Special Waste Landfill, Soil Processing Facility); or	
		Stockpiled for up to 30 calendar days pending laboratory results using the EPH and VPH Analytical Methods. (See Appendix B for stockpile criteria and sampling requirements.)	IF all results are below the values in Appendix B - Table 1, use soil as "Construction Fill" with the limitation that it cannot be placed in a residential setting or within a "protected natural resource" as defined by 38 M.R.S. §480-B (8). IF any result is above its value in Appendix B - Table 1, soil must be disposed at an approved facility (e.g. Special Waste Landfill, Soil Processing Facility).
Moderately to substantially contaminated	The bag-headspace measurements, for gasoline contamination, have PID readings above the Leaching to Ground Water Notification levels; or The oleophilic dye test result, for fuel oil contamination, is "Saturated or "Positive".	Live-loaded or stockpiled and must be disposed at an approved facility (e.g. Special Waste Landfill, Soil Processing Facility).	

6.0 QUALITY ASSURANCE/QUALITY CONTROL

Data quality objectives (DQOs) should be stated in the SAP. Quality Assurance/Quality Control (QA/QC) samples may be collected if needed to meet DQOs. Typical types of QA/QC samples that may be collected or prepared at the laboratory include replicate Multi-increment samples to allow determination of an upper contaminant level for the decision unit, laboratory control blank spikes, and analysis of reference material containing known concentrations of the target analytes. All analytical data should be reviewed and assessed to determine if DQOs have been met. If review indicates DQOs have not been met, corrective action will be recommended by the reviewer.

7.0 REFERENCES

DRAFT Protocol for the Off-site Beneficial Use of Surplus Soil as Construction Fill at DEP Supervised Projects that are Contaminated with Virgin Petroleum, Maine DEP, Bureau of Remediation & Waste Management, August 2017

Massachusetts Department of Environmental Protection, Division of Environmental Analysis, Office of Research and Standards, Bureau of Waste Site Cleanup (May 2004, Revision 1.1). METHOD FOR THE DETERMINATION OF EXTRACTABLE PETROLEUM HYDROCARBONS (EPH).

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Rules for Underground Oil Storage Facilities, 06-096 C.M.R. ch. 691 (effective date September 16, 1991, amended September 26, 2018-filing 2018-205)

Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014.

RWM-PP-006 Conceptual Site Model
RWM-PP-005 Eligible Cleanup Costs and Fund Insurance Program
RWM-PP-007 Sampling and Analysis Plan
RWM-PP-004 Compendium of Field Testing of Soil Samples for Gasoline and Fuel Oil

US EPA 40 C.F.R Part 280

Appendix A
Sizing Granular Activated Carbon (GAC) Treatment Systems for Short-Term Dewatering at Petroleum Sites

APPENDIX A – SIZING GRANULAR ACTIVATED CARBON (GAC) TREATMENT SYSTEMS for SHORT TERM DEWATERING AT PETROLEUM UST SITES

Introduction

On site, short term, treatment systems for petroleum contaminated groundwater are typically comprised of a settling/separation tank, a particulate bag filter, granular activated carbon (GAC) and sedimentation/erosion control measures for the discharge. This appendix provides recommended processing rates for standard vessel geometries in order to maximize the removal with the minimum amount of GAC. The standard geometries, GAC volume, flow rates, organic capacity, and sample and screen interval, across a range of concentrations are summarized in the attached TABLE 1. (The Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014 contains best practices for dewatering excavations and types of sediment controls.)

Pre and post components of the GAC system, the contaminant concentration, treatment process rate, and total volume of groundwater to be treated are based upon the hydrogeological setting and construction objectives and are to be established in advance of sizing the GAC system.

System Design

A critical factor in maximizing organic removal with the least amount of GAC is to process at the flow rates listed with the geometries in Table 1. Effective operation of GAC treatment is a function of the velocity through the media (referred to as Surface Loading Rate – SLR) and the time in contact with the media (referred to as Empty Bed Contact Time – EBCT). Maintaining a an SLR of at least 2 gallons per minute and maintaining an EBCT of at least 15 minutes increases the utilization and performance of the media. As SLR and EBCT are inversely related, the specified flow rates in TABLE 1 represent the optimum balance for the particular vessel geometry and carbon volume and must be maintained. Selection of a vessel geometry and carbon volume is commitment to the specified flow rate that must be controlled and monitored through pump, valve and metering mechanisms.

The above design parameters are based upon long term treatment operations required for plume control or potability. Dual GAC vessels in series, each sized to provide an EBCT of at least 15 minutes and an SLR of between 2 and 10 gallons per minute is the design basis for long term operations. The second vessel in these systems provide 100 % redundancy as a safety factor and allows for operations to continue when the lead vessel needs to be replaced and the lag vessel becomes the lead.

Dual GAC vessels in series are also the design basis for treatment of groundwater generated during dewatering at UST sites. Considering the short term, one-time, complete use at UST sites, the 15-minute contact time can be met across the two vessels rather than in each vessel.

The GAC life provided in TABLE 1 represents the capacity of one completely utilized vessel but the contact time necessary for complete utilization requires incorporation of the second vessel.

Two beds are necessary so what is the advantage of allowing 7.5 minutes EBCT per bed? In contrast to a potable water supply where breakthrough of the first bed requires rebedding the lead vessel and rotating the lag vessel into the lead position, rebedding is not necessary upon breakthrough of the first vessel for a short-term system.

The capacity is based primarily upon an empirical database referenced by EPA[i]. The capacity from the empirical database was compared to theoretical estimates and data from carbon suppliers. There is no accounting for the native organics in the groundwater and details about the sites in the empirical database were not found so applying it to this situation is appropriate but carries a significant number of unknowns. Not accounting for organics and the unknowns of the database are compensated for with a monitoring schedule that includes analytical testing and field screening/observations.

If evaluating a “package” system supplied by Others, it is helpful to know that a 2-foot-deep GAC bed depth provides both the 7.5-minute EBCT and SLR of 2 gallons per minute per square foot. Cutting the depth to below 2 feet, requires a proportional reduction in EBCT or SLR. Similarly, increasing the depth, proportionally increases either the EBCT or the SLR. This can be seen in Table 1, under the 24-inch diameter vessel where the depth goes from 2 to 4 feet, the EBCT doubles to 15 minutes with the SLR being held constant at 2 gallons per minute per square foot.

System Monitoring

The monitoring schedule in TABLE 1 is one tenth of the estimated capacity (in gallons of contaminated groundwater) of the fully utilized GAC in a single vessel. The screening interval is fixed and required throughout the operation.

The schedule for sampling (for lab analysis) generally coincides with the screening interval. An exception is with process rates above 14 gallons per minute where the daily process volume more than doubles the monitoring interval. At the higher flow rates indicated in TABLE 1, sampling daily is acceptable.

Co-collecting samples for lab analysis during each screening event may be appropriate for the first three events to generate an understanding about the influent, GAC performance and correlation between lab and filed screening. To enhance the correlation study, sampling/screening from all locations is recommended during the first three events.

Subsequent sampling for lab analysis is dependent upon many site and analytical (turnaround) factors and it is recommended that the longer term operational sampling plan be developed on a

site specific basis. After the first three rounds of monitoring, receipt of analytical results, and compilation of the data with the field screening results, the information is to be reviewed and discussed with the DEP representative to identify appropriate modifications in the monitoring scope and schedule. Of course, significant changes in water quality or operations should be brought to DEP's attention as soon as they are identified.

Monitoring locations/components include the excavation(s), the storage tank(s), before, between and after GAC, flow rate, flow volume and pressure. Attention to and interpretation of the excavation water and between GAC units results at each site is important with regard to: catching changes in water quality, developing an understanding of the actual GAC performance, adjusting the monitoring scope and interval based upon actual performance, and setting expectations for if and when carbon change outs or treatment modifications will be necessary. Under stable influent concentrations and maintaining the design flow rate, it is reasonable to use volume processed at the time of breakthrough of the first vessel as an estimate of the remaining capacity of the system. Site specific results and indicators are to be favored over the capacity estimates provided in TABLE 1 and a primary goal of screening and sampling is to identify breakthrough of the first GAC and adjust the monitoring and re-bed schedule accordingly.

The scope of the monitoring is based upon the site particular contaminants of concern. At a gasoline UST site, analysis is predominantly Massachusetts DEP Method for Volatile Petroleum Hydrocarbons (VPH) and can include lead and lead scavengers per EPA Method 8260. Each monitoring event is to include observational screening (appearance, odor) and field screening. Preliminarily acceptable/under consideration field screening methods for petroleum in groundwater include use of a photoionization detector (PID) as presented in Maine DEP's PID Screen for Oil in Water (PIDSOW) and OIL STICKS™. Co-collecting screening and analytical samples and tabulating the results is recommended to determine if a correlation exists and if so, identify how it can serve the monitoring program going forward.

Use and Application of TABLE 1

The following TABLE 1 provides contaminated groundwater capacities (in gallons), along with recommended screening and sampling intervals, across a range of influent concentrations for a few common vessel geometries. There are several approaches to using TABLE 1 but all require understanding of the hydrogeology and construction objectives. Necessary information includes dewatering volume, duration, process rate and concentration. In situations where information is limited, selecting a larger capacity system is recommended with the understanding that a specific treatment flow rate is necessary to effectively utilize the GAC bed. For instance, a system that could be considered a "baseline requirement" on sites with little or no preconstruction information is a 36" diameter vessel with a 4-foot-deep GAC bed which can process 40,000 gallons of 10 PPM contamination at a rate of 14 gallons per minute.

References

Department of the Army Dg 1110-1-2, U.S. Army Corps of Engineers Adsorption Design Guide No. 1110-1-2, 1 March 2001. https://apps.dtic.mil/dtic/tr/fulltext/u2/a403095.pdf

"Cleanup of Releases from petroleum USTs". USEPA/530/UST-88/001, April 1988.

Maine Department of Environmental Protection Bureau of Remediation and Waste Management
SHORT TERM PETROLEUM CONTAMINATED GROUNDWATER MANAGEMENT at UST SITES

APPENDIX A - TABLE 1 - SIZING GRANULAR ACTIVATED CARBON (GAC) SYSTEMS

	DESIGN			GEOMETRY										ESTIMATED GAC CAPACITY (in gallons) and RECOMMENDED SCREENING AND SAMPLING INTERVAL (gallons) OVER a RANGE of PETROLEUM CONCENTRATIONS and GEOMETRIES								
OPTION	**Surface Loading Rate (SLR)**		**EBCT**	**Depth (D) = V/SA**	**Vessel Diameter (DIA)**		**Radius (r) DIA/2**	**Surface Area (SA) 3.14 x r2**	**Volume (V) GAC**			**Process Rate (Q) = SLRxSA**		<1 PPM			<10 PPM			<30 PPM		
	GPM/SF	CFPM/SF	MIN	Feet	Inches	Feet	Feet	SF	CF	Gallons	Pounds	GPM	CFM	Capacity	Screen	Sample	Capacity	Screen	Sample	Capacity	Screen	Sample
24" DIA	2	0.27	7.5	2	24	2	1	3.14	6.3	47.1	173.3	6.3	0.8	200000	20000	20000	20000	2000	2000	INSUFFICIENT CAPACITY		
Double D Same Q	2	0.27	15.0	4	24	2	1	3.14	12.6	94.2	346.5	6.3	0.8	400000	40000	40000	40000	4000	4000	INSUFFICIENT CAPACITY		
Double D Double Q	4	0.53	7.5	4	24	2	1	3.14	12.6	94.2	346.5	12.6	1.7	400000	40000	40000	40000	4000	4000	INSUFFICIENT CAPACITY		
30" DIA	2	0.27	7.5	2	30	2.50	1.25	4.91	10	73.4	269.8	9.8	1.3	200000	20000	20000	20000	2000	2000	INSUFFICIENT CAPACITY		
Double D Same Q	2	0.27	15.0	4	30	2.50	1.25	4.91	20	146.8	539.7	9.8	1.3	400000	40000	40000	40000	4000	4000	20000	2000	2000
Double D Double Q	4	0.53	7.5	4	30	2.50	1.25	4.91	20	146.8	539.7	19.6	2.6	400000	40000	40000	40000	4000	DAILY	20000	2000	DAILY
36" DIA	2	0.27	7.5	2	36	3.00	1.50	7.07	14	105.7	388.6	14.1	1.9	400000	40000	40000	40000	4000	DAILY	20000	2000	DAILY
Double D Same Q	2	0.27	15.0	4	36	3.00	1.50	7.07	28	211.4	777.2	14.1	1.9	400000	40000	40000	40000	4000	DAILY	20000	2000	DAILY
Double D Double Q	4	0.53	7.5	4	36	3.00	1.50	7.07	28	211.4	777.2	28.3	3.8	400000	40000	40000	40000	4000	DAILY	20000	2000	DAILY

NOTES

1 The first "OPTION" listed for each diameter is the "optimum". The "optimum" is minimum amount of GAC in a geometry that provides the minimum recommended velocity (2 gallons per minute per square foot) to prevent channeling and the minimum recommended Empty Bed Contact Time (EBCT) of 15 minutes (two vessels, each providing 7.5 minutes). The second and third configurations for each diameter show the impact on doubling the depth of the carbon bed. With a doubling of the carbon depth, the EBCT can be doubled to provide 15 minutes per vessel (using only one vessel for the entire 15 minute EBCT may be allowed for low volumes), or the flow rate can be doubled with the baseline EBCT per vessel (7.5 min). Vessels providing the diameters (24", 30" and 36")and heights (72" for all 3 diameters) are as supplied by or an equivalent to Pentair.

2 GAC CAPACITY: Literature on an empirical database, experimental theory and from carbon suppliers was reviewed and compared. The capacities in this table are primarily based upon an empirical database referenced in EPA's April 1988 Document EPA/530/UST-88/001 "Cleanup of Releases from Petroleum USTs: Selected Technologies". Generally, the posted capacities are within the order of magnitude and near or below the EPA reported estimated capacities. Carbon life predictions are less reliable with higher concentrations and the 30 PPM capacities are reduced by 1/2 in consideration of the reduced reliability. The capacities are based upon the volume of GAC in a single vessel and should be considered the capacity of the entire 2 vessel system when sizing for a site.

3 SCREENING and SCREENING INTERVAL: Comprehensive screening (excavation, storage tank, before, between and after GAC) is required at "start-up" which is defined as the first hour or 1000 gallons of operation. The ongoing screening interval is set at 1/10th of the estimated capacity. Due to the rate that groundwater must be processed and the turn around time asociated with lab analysis, catching changes in water quality and making operational decisions must be based upon field screening results. Field screening tests with a PID and observations (visual, odor) are to be collected at each screening interval and considered collectively (multiple lines) in decision making.

4 LAB ANALYSIS and SAMPLE INTERVAL: Comprehensive analysis (excavation, storage tank, before, between and after GAC) is required at "start-up" which is defined as the first hour or 1000 gallons of operation. The "DAILY" sample interval recognizes that at the higher processing rate, the screening interval may be reached several times during a day. Daily samples rather than volume interval samples are acceptable with the high flow rates.

Appendix B
Soil Stockpiling and Off-site Use as Construction Fill

APPENDIX B – SOIL

Table 1: Non-hazardous Petroleum Contaminated Soil Suitability for Off-Site Use Guidelines

Compound/Fraction	Value (mg/kg)	Basis*
Gasoline Contaminated Soils		
Benzene	0.51	LTG
Ethylbenzene	0.81	LTG
Methyl tert-Butyl Ether	0.19	LTG
Naphthalene	1.7	LTG
Toluene	8.1	LTG
Xylene	26	LTG
C5-C8 Aliphatics	1400	Res
C9-C12 Aliphatics	2700	Res
C9-C10 Aliphatics	75	LTG
Lead	100	691
Diesel/Kerosene/Heating Oil Contaminated Soils		
2-Methylnaphthalene	3.6	LTG
Acenaphthene	170	LTG
Acenaphthylene	68	LTG
Anthracene	760	Ex/Con
Benzo(a)anthracene	0.86	Rural Bkg
Benzo(a)pyrene	1.5	Rural Bkg
Benzo(b)fluoranthene	1.3	Rural Bkg
Benzo(g,h,i)perylene	750	Res
Benzo(k)fluoranthene	2.6	Res
Chrysene	26	Res
Dibenz(a,h)anthracene	0.28	Urban Bkg
Fluoranthene	1000	Res
Fluorene	120	LTG
Indeno(1,2,3-cd)pyrene	0.4	Rural Bkg
Naphthalene	1.7	LTG
Phenanthrene	97	LTG
Pyrene	750	Res
C9-C18 Aliphatics	2700	Res
C19-C36 Aliphatics	10,000	ceiling
C11-C22 Aromatics	460	LTG

*LTG – Leaching to Groundwater
Res – Residential Direct Contact
Ex/Con – Excavation/Construction Worker Direct Contact
Bkg – Background
691 – Chapter 691 Requirements

Criteria for Temporary Surplus Soil Stockpiles

"Slightly Contaminated" or "Moderately to Substantially Contaminated" soils may be temporarily stockpiled on-site or off-site in conformance with the following criteria:

- On-site: Petroleum contaminated soil that is being evaluated for off-site use may be stockpiled on the site of generation pending the receipt of laboratory results. Surplus soil stockpiled for longer than 2 days should be underlain and covered with an impermeable material that has been secured to minimize the potential for release of contaminants to the environment (e.g. volatilization, leachate generation, runoff, and wind transport). See the Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014 for construction specifications.

- Off-site: In cases where sufficient on-site space is not available, a temporary off-site surplus soil stockpile location may be established provided the following setbacks and operational criteria are met. The distances of each of the setbacks and conformance with the operational criteria must be documented in the final report for the project. Any alternative setback or other deviation from the criteria must be authorized by MEDEP staff prior to the petroleum contaminated soil being stockpiled in an off-site location.

  Off-site petroleum contaminated stockpile(s) must be located:

  1. Greater than 300 feet from a private drinking water supply and greater than 1,000 feet from a public water supply well. These limits may need to be extended if water supplies are shown to be hydraulically down-gradient;

  2. Greater than 300 feet from surface water bodies;

  3. Greater than 300 feet from an occupied residential dwelling, unless the owner of the residence has consented in writing to a reduced setback;

  4. Greater than 100 feet from a sensitive environment such as a wildlife refuge, wetland, 100-year floodplain, or other similar area;

  5. On land with more than 3 feet of soil cover over bedrock;

  6. On land without ponding, springs or groundwater discharge, significant gully erosion or significant drainage onto the stockpile area;

  7. On sites where the water table is more than 3 feet from the ground surface (saturated soil should be considered evidence of the water table);

  8. On slopes less than 5%; and,

  9. On ground that is not covered with snow (frozen ground with no snow cover may be acceptable with DEP approval);

     Additionally:

10. Surplus soil stockpiled for longer than 2 days shall be underlain and covered with an impermeable material that has been secured to minimize the potential for release of contaminants to the environment (e.g. volatilization, leachate generation, runoff, wind transport);

11. Surplus soil shall be stockpiled in accordance with the Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014; and,

12. Public access to the stockpile site shall be restricted; (e.g. by fence, posting, gate or cable).

13. Confirmation sampling is needed once the stockpile is removed to document that all the impacted soils have been removed at the end of the project. The scope of the plan will be site specific based on the project and location of the stockpile.

NON-HAZARDOUS PETROLEUM CONTAMINATED SURPLUS SOIL EVALUATION PLAN

Generator/Owner of Surplus Soil	Temporary Off-Site Stockpile Location
MEDEP Spill #	GPS Coordinates
Source of Soil	Street Address
Generator Name	Landowner Name
Street Address	Contact Phone Number
Contact Name	
Contact Phone Number	

As the generator/owner of the petroleum contaminated soil and the party responsible for compliance with the MEDEP Standard Operating Procedure (SOP) No. RWM-PP-012: Managing Non-Hazardous Petroleum Contaminated Ground Water and Surplus Soil at UST Sites, I hereby certify that all the representations made on this form are true and correct to the best of my knowledge. Further, I hereby certify that the Surplus Soil: (1) will be temporarily stockpiled in accordance with the Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014 and all other MEDEP programs, (2) that all required local, state and other permits/authorizations that pertain to its use will be obtained, and (3) that all of the temporary stockpiling provisions of the (SOP) No. RWM-PP-012: Managing Non-Hazardous Petroleum Contaminated Ground Water and Surplus Soil at UST Sites will be met, and (4) all surplus soil will be removed from the temporary stockpile location within 30 days of receipt of laboratory analyses of the surplus soil.

X _____ X _____

Signature of Soil Generator/Owner or Repre... Title

X _____ X _____

Printed Name Date

As landowner of the temporary stockpile location, I hereby give approval to stockpile, evaluate, and remove the soil described above at the proposed location. I also hereby grant property access to MEDEP investigators for the purpose of inspecting the stockpiled surplus soil at any reasonable time. I understand that the soil must stay at this location until its removal is approved by the MEDEP, and that the site and all soils must remain stabilized to prevent erosion in accordance with Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014.

X _____ X _____

Signature of Landowner Date

X _____

Printed Name

****

X _____ X _____

DEP Authorization Signature Date

X _____

Printed Name

Determining the Suitability of Non-Hazardous Petroleum Contaminated Soils for Off-Site Use as Construction Fill

Sampling Documentation – The following information should be documented as part of the sampling program:

- a map of the stockpile site, with the sample locations marked;
- the volume of petroleum contaminated surplus soil and the type of petroleum contamination in each stockpile;
- the excavation and sampling dates;
- the hard copy laboratory report which includes results, chain-of-custody forms, and laboratory quality assurance/quality control.

Additionally, laboratory results should be submitted to the MEDEP as Electronic Data Deliverables (EDDs) in MEDEP-approved format. The EDDs should include all information listed in the "Analytical Methods" subsection, below.

Number of Laboratory Samples – The number of laboratory samples collected from the stockpile of petroleum contaminated surplus soil depends upon the pile size, as follows (unless multi-incremental sampling methods are being used):

SIZE OF STOCKPILE	NUMBER OF SAMPLES
<100 cubic yards	1
100 to 200 cubic yards	2
201 to 300 cubic yards	3
301 to 400 cubic yards	4
401 to 500 cubic yards	5
>500 cubic yards	5 + 1 additional sample/ 100 cubic yards over 500

Sampling Method – The stockpile of petroleum contaminated surplus soil should be divided into units of 100 cubic yards or less. Each unit will be gridded into 30 roughly equal cells. A single sample will be collected from each unit, comprised of an increment of soil collected from each of the 30 cells. For Volatile Petroleum Hydrocarbons (VPH) samples the increment collected from each cell will be 5 grams, making up a total unit sample volume of 150 grams. For Extractable Petroleum Hydrocarbons (EPH) samples the increment collected from each unit should be 2 ounces, making up a total unit sample volume of 60 ounces. The increments will be collected from the approximate central area of each cell, at varied depths to ensure that the full depth profile of the unit is represented in the final sample. Care should be taken to avoid collecting material with a grain size greater than 2 millimeters.

Analytical Methods – Testing soil using the EPH or VPH analytical methods depends on the petroleum product and age of contamination. The MEDEP Petroleum Remediation Guidelines provide the following recommendations. When leaded gasoline impacted soils are stockpiled, analysis will include lead. A site-specific sample and analysis plan is required for stockpiles that include waste oil impacted soils.

Petroleum Product	VPH	EPH
Gasoline	**X**	
Fresh diesel/#2 fuel oil	**X**	**X**
Weathered diesel/#2 fuel oil		**X**
#3 - #6 fuel oils		**X**
Waste oil	**X**	**X**
Jet fuels/kerosene	**X**	**X**
Unknown oils or sources	**X**	**X**

All laboratory samples of petroleum contaminated surplus soil should be analyzed by a laboratory certified by the Maine Department of Health and Human Services for the laboratory method and meet quality control standards set forth in the analytical method. Lab reports should include:

- Surrogate recoveries in percent
- Method blank results
- Laboratory Control Spike (LCS) results in percent
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) results in percent
- Laboratory methods must have reporting limits (RLs) equal to or less than guidelines listed in Appendix B Table 1.

CERTIFICATE OF BENEFICIAL USE OF NON-HAZARDOUS PETROLEUM CONTAMINATED SURPLUS SOIL

Generator/Owner of Surplus Soil	Beneficial Use Location
MEDEP Spill #	GPS Coordinates
Generator Name	Street Address
Street Address	Landowner Name
Contact Name	Contact Phone Number
Contact Phone Number	

As the generator/owner of the petroleum contaminated soil and the party responsible for compliance with MEDEP Standard Operating Procedure (SOP) No. RWM-PP-012: Managing Non-Hazardous Petroleum Contaminated Ground Water and Surplus Soil at UST Sites, I hereby certify that all the representations made on this form are true and correct to the best of my knowledge.

Further, I hereby certify that the Surplus Soil was (1) only used as construction fill, (2) that it was used in accordance with the Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014 and all other Department programs, (3) that all required local, state and other permits/authorizations that pertain to its use were obtained, and (4) that all of the other provisions of the (SOP) No. RWM-PP-012: Managing Non-Hazardous Petroleum Contaminated Ground Water and Surplus Soil at UST Sites, were met.

X

Signature of Soil Generator/Owner or Repre...

X

Title

X

Printed Name

X

Date

As landowner of the beneficial use location, I hereby certify that I (1) granted the soil generator/owner permission to use the soil on my property, and (2) grant property access to MEDEP investigators for the purpose of inspecting the beneficial use at any reasonable time. I understand that the soil must stay at this location and that the site and all soils must remain stabilized to prevent erosion in accordance with Maine Erosion and Sediment Control Practices Field Guide for Contractors, revised 2014.

X _____ X _____

Signature of Landowner Date

X _____

Printed Name

****

X _____ X _____

DEP Authorization Signature Date

X _____

Printed Name

RWM-PP-012_ManagingContaminatedGroundwaterandSurplusSoils

Final Audit Report 2021-09-08

Created:	2021-08-25
By:	Lindsay Caron (LINDSAY.ER.CARON@MAINE.GOV)
Status:	Signed
Transaction ID:	CBJCHBCAABAAd4Co0f7JnSQGxbPJnQ8NdN1oyKyLuy9e

"RWM-PP-012_ManagingContaminatedGroundwaterandSurplus Soils" History

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COVERSHEET
STANDARD OPERATING PROCEDURE

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

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COVERSHEET
STANDARD OPERATING PROCEDURE

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

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

George Seel — Signature — 10/22/12 — Date
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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/rwm/ust/lustqaplan.htm). 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 these 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/rwm/sops/index.htm).

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/rwm/sops/index.htm). 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^{o}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/rwm/ust/sop/EDD_Oil_Field_Sheets_blank.xls) for use specifically with these field tests as well as laboratory EDD spreadsheets (http://www.maine.gov/dep/rwm/egad/ME_DEP_EGAD_EDDv5.1_FINAL_rhd.xls) 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

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

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	Sample 1				Sample 2				Sample 3	
2										
3	Sample 4				Sample 5				Sample 6	
4										
5										
6										
7										
8										
9										
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	Sample 3		Sample 7				Sample 8			
2										
3	Sample 6		Sample 9				Sample10			
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

South Wall: 50-feet long, 15 feet deep

	105 – 120	125 – 140	145 – 150
1 – 2	Sample 11	Sample12	Sample13
3 – 15	Sample 14	Sample 15	Sample16

West Wall 50 feet long, 15 feet deep

	155 – 160	165 – 180	185 – 200
1 – 2	Sample 13	Sample 17	Sample 18
3 – 15	Sample 16	Sample 19	Sample 20

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

	5 – 10	15 – 20	25 – 30	35 – 40	45 – 50
5 – 10	Sample 21	Sample 22	Sample 23	Sample 24	Sample 25
15 – 20	Sample 26	Sample 27	Sample 28	Sample 29	Sample 30
25 – 30	Sample 31	Sample 32	Sample 33	Sample 34	Sample 35
35 – 40	Sample 36	Sample 37	Sample 38	Sample 39	Sample 40
45 – 50	Sample 41	Sample 42	Sample 43	Sample 44	Sample 45

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.