SPECIFICATIONS –
JOB SPECIFIC

Item **SPECIAL PROVISION INDEX** **Page**
Description

106.01
BUY AMERICA JOB SPECIFICATION (BABA)

Remove Section 106.01.1 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024 in its entirety and replace with:

106.01.1 Buy America Job Specification (BABA)

Introduction:
While existing Buy America requirements previously applied to iron, steel, and certain manufactured goods, the Infrastructure Investment and Jobs Act (IIJA) expands requirements to include all manufactured products and construction materials in construction contracts that include Federal Aid funding in the construction phase. Additional information available in 23 CFR 635.410 Buy America and it's Q&A at FHWA's Buy America Q and A for Federal-aid Program - Buy America - Contract Administration - Construction - Federal Highway Administration (dot.gov) [fhwa.dot.gov]

Purpose:
Provide materials from domestic sources when products are permanently incorporated into the work.

Ensure all manufacturing processes, including applications of coatings, occur in the United States. A coating includes all processes required to apply the coating to a product to protect or enhance the value of the product. The requirements of this JS are not applicable to equipment, tools, and temporary items, including materials left in place at the Contractor's convenience.

Certifications:
All certifications are submitted by the prime Contractor. When submitting certifications for materials that are subject to the requirements of this specification, the certification shall be on Form provided by the Department.

Determination of Material Category:

• Foreign or Uncertified Products.

Buy America does not apply to minimal use of steel/iron materials provided that the total cost of all foreign source items used in the contract, as delivered to the project site, is less than $2500 or one-tenth-of-one percent of the total contract amount, whichever is greater.

The total value is that shown to be the cost of the steel and iron products as delivered to the project site. Contractor to keep a log of foreign source items to ensure that the minimal use threshold is not exceeded during the life of the contract.

• Manufactured Products

Provide manufactured products produced in the United States.
A manufactured product is acceptable under this provision if:
The manufactured product was manufactured in the United States; and
The cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product.

• Construction Materials

The category of construction materials excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives.

Construction materials are materials that consist primarily of:

- Non-ferrous metals.
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- glass (including optic glass);
- lumber; or
- drywall.

Waivers:
The Contractor may submit a waiver request to the department using RIDOT procedures and form provided in the PMP document management folder. The form must reflect a detailed justification for the use of goods, products, or materials mined, produced, or manufactured outside the United States and including copies of all documentation verifying the unavailability of the material or product.

The Department will submit approved waiver requests to FHWA for review. The Contractor shall investigate and respond to any public comments made to the FHWA Office of Program Administration, indicating that a domestic supplier cannot provide the material for which a waiver has been requested. Final approval of the Buy America Waiver request will be made by the Administrator, Federal Highway Administration. The waiver will be effective the date following publication in the Federal Register.

Contractor fully understands there is no guarantee a waiver request will be approved. Any contract delays caused by this waiver process will be the sole responsibility of the contractor.

The contractor shall be responsible for all cost associated with any of the construction materials that are permanently incorporated into the project that does not meet the requirements of this Special Provision without prior written approval from the Department, up to and including removal and replacement.

The Contractor may submit a waiver request to the department during construction:

1. Determine which type of the three waivers applies.

   • Public Interest Waiver: applying the domestic content procurement preference would be inconsistent with the public interest. A waiver in the public interest may be appropriate where the approving federal agency determines that other important policy goals cannot be achieved consistent with the IIJA requirements, and the proposed waiver would not meet the requirements for a nonavailability or unreasonable cost waiver.

   • Nonavailability Waiver: for types of iron, steel, manufactured products, or construction materials that are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality.

   • Unreasonable cost waiver: the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent. Provide documentation that no domestic alternatives are available within this cost parameter. Document in the waiver a comparison of the cost of the domestic product to the cost of the foreign product or a

comparison of the overall cost of the project with domestic products to the overall cost of the project with foreign-origin products.

2. Contractor shall prepare waiver documentation including waiver form provided by RIDOT; located in the PMP portal and submit to the Department's Project Manager with a cc: to the Construction Manager (RE)

3. RIDOT/Project Manager to Submit waiver to Federal Highway Division.

4. Federal Highway Division submits the waiver to the Made in America Office. All waivers have to be submitted by Federal agencies to the Made in America Office. Project specific waivers require a minimum of 15 calendar day public comment period. General applicability waivers are subject to a minimum 30 calendar day public comment period. Federal agencies are responsible for performing due diligence and approving or rejecting waivers.

108.03
PROSECUTION AND PROGRESS

In accordance with **Section 108.03; Prosecution and Progress, General Requirements** the Schedule Level for this contract is **Schedule Level B.**

108.1000
PROSECUTION AND PROGRESS

Phase Completion:

Phase 1A and 1B Work: The following fine/charge for not completing Phase 1A and 1B work by **June 8, 2025** is $1,000.00 per day.

Substantial Completion:

The following fine/charge for not completing contract work according to Section 101.89 by **May 30, 2026** is $1,000.00 per day.

Final Acceptance:

All Contract work shall be completed as defined by Section 105.18 by **October 27, 2026** or a Daily Charge will be deducted from any money due in the amount of $1,950.00 per day.

SECTION 110
FINES/CHARGES TABLE

Remove Section 110 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024 in its entirety and replace with:

The Department will place the Contractor on notice for each failure to perform or comply with each provision. The Department will follow its internal process to review and assess the fines or charges in the Table below.

Specification	Failure to Perform and/or Comply	Frequency	Posted Speed up to 35 MPH	Posted Speed over 35 MPH
104.08	Maintenance of Traffic	Each day or location	$ 5,000.00	$ 10,000.00
104.09	Maintenance of Public Access	Each day per location	$ 2,500.00	$ 5,000.00
104.15	Environmental Protection	Each day per incident and location	$ 1,000.00	$ 1,000.00
105.01	Authority of the Engineer	Each incident	$ 1,000.00	$ 1,000.00
105.05	Contractor Removal of Personnel	Each day per person	$ 1,000.00	$ 2,000.00
105.07	Cooperation Between Contractors	Each day	$ 1,000.00	$ 1,000.00
105.12	Load Restrictions	Each Incident	$ 1,000.00	$ 1,000.00
105.13	Maintenance During Construction	Each day per location	$ 500.00	$ 1,000.00
105.15	Opening Sections of Project to Traffic	Each day	$ 1,000.00	$ 2,000.00
105.22	Tolling Facilities	Each incident	Daily Lost Revenue	Daily Lost Revenue
106.05	Storage of Materials	Each day per location	$ 1,500.00	$ 3,000.00
107.07	Sanitary, Health and Safety Provisions	Each day per location	$ 1,000.00	$ 2,000.00
107.08	Public Convenience and Safety	Each incident per day	$ 500.00	$ 1,000.00
107.09	Barricades and Warning Signs	Each incident per day	$ 500.00	$ 1,000.00
107.11	Protection and Restoration of Property and Landscape	Each day	$ 500.00	$ 1,000.00

107.13	Public Lands Protection	Each day per location	$ 1,000.00	$ 2,000.00
107.18	Hazardous Material	Each day per location	$ 1,000.00	$ 2,000.00
108.03	Prosecution and Progress	Each incident per day	$ 500.00	$ 1,000.00
108.03(c)	Meeting Minutes Not Provided/Not prepared for Project Status Meeting	Each meeting	$2,500.00	$2,500.00
108.04	Limitation Of Operations	Each incident per day	$ 500.00	$ 1,000.00
108.05	Character of Workers	Each person per day	$ 500.00	$ 1,000.00
108.06	Equipment, Means, and Methods	Each Incident per day	$ 500.00	$ 1,000.00
108.08	Phase Completion	Each day	Job Specific	Job Specific
108.08	Substantial Completion	Each day	Job Specific	Job Specific
108.08	Final Acceptance	Each day	Job Specific	Job Specific
206	Perimeter Erosion Controls	Each day	$ 500.00	$ 1,000.00
207	Check Dams	Each day	$ 500.00	$ 1,000.00
209	Storm Drain Inlet Protection	Each Incident per day	$ 500.00	$ 1,000.00
212.03.3	Failure to Maintain, Erosion, Sediment, and Pollution Prevention Controls	Each day per location	$ 1,500.00	$ 1,500.00
401	Cleaning and sweeping pavement	Each day	$ 500.00	$ 1,000.00
401.03.6	Quality Control (QC)	Per Ton	$10.00	$10.00
401.03.7	Joints	Each incident	$30,000.00	$30,000.00
403	Asphalt Emulsion Tack Coat	Per Square Yard	$50.00	$100.00
410	Temporary Patching of Potholes and Trenches	Each location per day	$1,000	$1,000
413	Rideability – Surface Course	Each day	$ 1,000.00	$ 2,500.00

814.03.8(c)	Falling Temperatures	Each day, incident, and location	10% if no structural effect	10% if no structural effect
905.03.1	Sidewalks – Scheduling Construction	Each day or location	$ 500.00	$ 1,000.00
905.03.2	Compliance with the Americans with Disability Act	Each day or location	$ 1,500.00	$ 3,000.00
907	Dust Control	Each day or location	$ 500.00	$ 1,000.00
914	Flagpersons	Hourly per person	$ 200.00	$ 300.00
916	Crash Cushions	Daily per each	$ 1,000.00	$ 2,000.00
922	Temporary Construction Signs	Daily per each	$ 1,000.00	$ 2,000.00
923	Portable Channelizing Devices and Barricades	Hourly per location	$ 500.00	$ 1,000.00
924	Advanced Warning Arrow Panel	Each day or location	$ 500.00	$ 1,000.00
925	Portable Changeable Message Sign	Each location or Day	$ 500.00	$ 1,000.00
926	Anchored and Unanchored Barrier for Temporary Traffic Control	Hourly per location	$ 1,000.00	$ 2,000.00
928	Truck Mounted Attenuator (TMA)	Per Hour	$ 500.00	$ 1,000.00
929	Field Offices	Each day	$ 500.00	$ 500.00
930	Plant Field Laboratory	Each day	$ 500.00	$ 500.00
934	Field Control and Construction Layout	Each day	$ 500.00	$ 1,000.00
937.05.2(a)	Maintenance	Each day	$ 5,000.00	$ 5,000.00

937.05.2(b)	Movement	Per instance	$5,000 and an additional $1,000** per half hour per lane (paved shoulders will be counted as lanes) per direction of travel that travel lane(s) remain out of compliance with the Transportation Management Plan.	$5,000 and an additional $1,000** per half hour per lane (paved shoulders will be counted as lanes) per direction of travel that travel lane(s) remain out of compliance with the Transportation Management Plan.
937	Daily Reports upon request if not provided within 24 hours	Each day	$ 500.00	$ 1,000.00
937	Emergency Response if not initiated within 90 minutes	Per hour	$ 3,000.00	$ 6,000.00
941	e-Ticketing HMA	Per Ton	$10.00	$10.00
941	e-Ticketing Concrete	Per CY	$10.00	$10.00
944	Lighting for Night Work Operations	Each day	$ 2,500.00	$5,000.00
L02.03.7	Seeding - Care During Construction	Each location or day	$ 500.00	$ 1,000.00
L03.03.10	Sodding - Care During Construction	Each location or day	$ 500.00	$ 1,000.00
L06.03.10	One Year Establishment Period	Each day	$ 250.00	$ 500.00
L07.03.10	Extended Establishment Period	Each day	$ 250.00	$ 500.00
T13	Detectors And Relays	Each location per day	$ 500.00	$ 1,000.00

** *Project specific hourly charges shall be set at a default value of $1,000 and increased accordingly based on the location of the project and other various project specific factors.*

Explanations. The following frequencies used in the above Table are applicable:

1. Per Each. Each individual sign, arrow panel, message board, truck mounted attenuator, barrier module (regardless of location).
2. Each Day. Fine applies once every calendar day.
3. Each Location. Each individual channelizing device setup, concrete barrier (regardless of locations).

4. Per On/Off Ramp. Each individual State numbered on ramp and off ramp (regardless of location).
5. Per Person. Each individual flag person (regardless of location).
6. Per Shoulder. Each individual high-speed lane and low-speed lane shoulder (regardless of location).
7. Per Travel Lane. Each individual travel lane, including all turn lanes (regardless of location).
8. After the first occurrence the amounts listed in the Table above will double for subsequent occurrences. Hourly items continue to be a single occurrence until they are no longer in violation.

110.01 EMERGENCIES

If emergency repair work has not been initiated within the 90-minute time frame specified above, the charge set forth above will be deducted from monies then due the Contractor until the repair work is completed.

CODE 202.9901
CONTAMINATED SOIL MANAGEMENT

DESCRIPTION: This work includes the management of site security/access, excavation, removal, stockpiling, and transportation of unclassified, contaminated, or hazardous soil according to the Environmental Protection Agency (EPA) and Rhode Island Department of Environmental Management (RIDEM) regulations, and in compliance with all applicable permits.

MATERIALS: Materials are specified in Subsection 202.02.3 Contaminated Soils of the Standard Specifications.

CONSTRUCTION METHODS: Construction Methods are specified in Subsection 202.03.4 Handling, Hauling, and Stockpile Management of Contaminated Soils and Unclassified Soils of the Standard Specifications and modified as follows:

Subsection 202.03.4.1 Health and Safety Plan modified as follows:
Ensure that the Contractor's and Subcontractor's employees who will be potentially exposed to the subsurface soils have OSHA 40-hour health and safety training and the eight-hour refresher training, if applicable.

Subsection 202.03.4.2 Applicable Laws and Regulations modified as follows:
Conduct the management of site security/access, excavation, removal, stockpiling, and transportation of unclassified, contaminated, or hazardous soil according to the Environmental Protection Agency (EPA) and Rhode Island Department of Environmental Management (RIDEM) regulations, and in compliance with all applicable permits.

Ensure that compliance with site security/access requirements, according to applicable regulations, are maintained during all earthwork operations. Maintain a daily field/operating report during the earthwork activities to include dates of earthwork activities, dates, and times of field sampling, soil management observations, and tracking related to stockpile generation and the documentation of lawful off-site disposition.

Subsection 202.03.4.7 Stockpiles modified as follows:
Maintain site security/access, fencing, erosion control hay bales, and dust control as required by the Contract at the stockpile locations and at all areas traveled for the stockpiling operation leading to and from the stockpile areas.

Subsection 202.03.5 Load, Haul, and Dispose Contaminated Soils of the Standard Specifications modified as follows:

If unclassified, contaminated, or hazardous soil will be stockpiled, place the soil on and cover with polyethylene sheeting.

METHOD OF MEASUREMENT: Method of Measurements are specified in Subsection 202.04 Method of Measurement of the Standard Specifications

BASIS OF PAYMENT: Basis of Payment are specified in Subsection 202.05 Basis of Payment of the Standard Specifications

CODE 301.9901
PEASTONE

DESCRIPTION: This work consists of providing, placing, shaping and compacting peastone, as well as providing and placing filter fabric, at the locations and within the limits specified on the Contract Documents and as directed by the Engineer.

MATERIALS: Peastone shall meet the requirements of Section M01, Gradation – Percent Passing Table of the Standard Specifications.

Filter fabric shall be a material suitable for the intended application, capable of preventing migration of backfill material into the peastone layer, while simultaneously permitting ground water to pass. The filter fabric shall be one that is included on the Department's Approved Materials List.

CONSTRUCTION METHODS: The peastone directly behind the integral backwall shall be placed but not compacted.

METHOD OF MEASUREMENT: This item shall be measured for payment by the units of "CUBIC YARD" actually placed in accordance with the plans, this specification, or as directed by the Engineer.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
PEASTONE	CY

The price so stated shall constitute full compensation for all labor, materials (including filter fabric), tools, equipment, and all incidentals required to finish the work, complete and accepted.

SECTION 401
DENSE GRADED HOT MIX ASPHALT (HMA) PAVEMENTS

Remove Section 401 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024 in its entirety and replace with:

401.01 DESCRIPTION.

This work includes constructing HMA pavements on prepared foundations.
HMA includes a mixture of aggregate, performance graded asphalt binder (PGAB), and filler if required. The aggregate is sized, graded, and combined in proportions necessary for the mixture to meet the gradation requirements of the job mix formula (JMF).

401.02 MATERIALS.

401.02.1 Aggregates.

Use aggregates that comply with Subsection M03.02.2 and AASHTO M 323. Ensure that no more than 10 percent of the aggregate in the HMA is natural sand with the exception of Class 4.75 HMA, which must include no more than 20 percent.

401.02.2 Performance Graded Asphalt Binder (PGAB).

Use PGAB that meets AASHTO M 320, M 332, R 29, and R 92.

PGAB Requirements

Class of Mix	PGAB Requirement
4.75, 9.5, 12.5, 19.0, and Base Courses	PG 64S-28
19.0 and Base Course with less than 15 percent RAP required	PG 64S-22
19.0 and Base Course with 15 to 25 percent RAP required	PG 58S-22
All classes designated as “Modified”	PG 64E-28 with a minimum 2.5 percent SBS polymer

If a class of HMA is designated as “with WMA,” use a warm mix additive. Select the WMA from the RIDOT Approved Materials List.

Do not use re-refined engine oil bottoms (REOB) in any PGAB.
Supply binder from a facility compliant with AASHTO Product Evaluation and Audit Solutions (PEAS)

401.02.3 Mix Design.

Use HMA mixes that conform to AASHTO M 323, “Standard Specification for Superpave Volumetric Mix Design.” Follow the design procedure for AASHTO R 35, “Standard Practice for Superpave Volumetric Design for Hot-Mix Asphalt (HMA).” Determine the optimum binder content (OBC) as follows:

- Determine the OBC for Class 4.75, Class 9.5, and Class 12.5 when not designated as base course using PG 64S-28.
- Determine the OBC for Class 4.75, Class 9.5, and Class 12.5 when designated as base course with less than 15 percent RAP using PG 64S-22.
- Determine the OBC for Class 4.75, Class 9.5, and Class 12.5 when designated as base course with 15 to 25 percent RAP using PG 58S-28.

- Determine the OBC for Class 19.0 with less than 15 percent RAP using PG 64S-22.
- Determine the OBC for Class 19.0 with 15 to 25 percent RAP using PG 58S-28.

Provide the effective voids in the mineral aggregate (VMAeffective) for each asphalt content during the mix design process. An individual certified in mix design technology by the Asphalt Institute shall develop and sign the mix design. Provide new mix designs no later than two weeks before the date when production of the mixture is scheduled to begin and provide a copy of the individual's certification. Do not produce a mixture for State projects until the mix design is approved by the Engineer. Provide mix designs on forms provided by the Engineer.

The following specific requirements and exceptions to AASHTO M 323 apply:

- Obtain the specific gravity, absorption, and consensus properties of the aggregates from RIDOT's most recent sampling and testing or from a laboratory accredited by AASHTO to perform AASHTO T 84 and T 85.
- Comply with the recommendations of Section 4.2 of AASHTO R 35.
- Use a coarse-graded mix as defined in Section 6.1.3 of AASHTO M 323.
- Ensure that the dust to binder ratio (P0.075/Pbe) is 0.5 to 1.0. Use the effective binder content to calculate this ratio.
- In addition to the sieves listed in Table 3 of AASHTO M 323, use the 0.600 mm, 0.300 mm, and 0.150 mm sieves. The 50.0 mm and 37.5 mm sieves are not required.
- Design Class 19.0 and mixes designated as base course with a 0 percent, 10 percent, 15 percent, 20 percent, or 25 percent RAP content. Do not use RAP in any other mix.
- Ensure that Ninitial is 6, Ndesign is 50, and Nmax is 75 gyrations.
- A moisture susceptibility test is not required.
- Ensure that the design VMA, VFA, air voids, and minimum optimum binder content (OBC) meet the criteria in the following Table.

HMA Properties

Class of Mix	VMA (minimum)	VFA	Air Voids	Minimum OBC
4.75	17.5%	70% – 80%	4%	7.0
9.5	16.5%	70% –80%	4%	6.0
12.5	15.5%	70% – 80%	4%	5.5
19.0	14.5%	70% – 80%	4%	5.0

Comply with the following procedures for each mix design:

- Provide three aggregate trial blend gradations for approval.
- After approval, blend the three trial aggregate blend gradations, and provide according to Section 4.2 of AASHTO R 35.
- Provide all trial mixture data and calculations determined per Section 9 of AASHTO R 35 on forms provided by the Engineer. The Engineer will determine which trial mixture will be used for the mix design procedure.
- After a new mix design is completed, provide to the Engineer for review and approval.
- The Engineer will provide the correction factors for each mix for each ignition furnace in the plant lab.

Provide the two gyratory cores (AASHTO T 312) and the theoretical maximum specific gravity sample (AASHTO T 209) at the optimum binder content to the Engineer.

Before beginning production of a new HMA mix, perform a successful plant trial batch for that mix. The Engineer will test a split of the sample taken by the Contractor. Provide notification of the date and time of the trial batch to the Engineer 24 hours in advance.

If there is a change in sources of materials, establish a new mix design before the new material is used. When the

Engineer determines that unsatisfactory results or other conditions make it necessary, establish a new mix design and provide it to the Engineer for approval.

401.02.4 Quality Assurance.

- Process Control. Exercise process control over all production operations. Provide constant monitoring of equipment, materials, and production activity such as testing and analysis to ensure that the HMA meets all applicable requirements and is produced within the allowable tolerances. Use personnel certified by Northeast Transportation Training and Certification Program (NETTCP) as an Asphalt Plant Technician. The technician is subject to RIDOT Independent Assurance sampling and testing.
- Acceptance Testing. The Engineer will conduct acceptance testing. Take samples at the direction and in the presence of the Engineer according to AASHTO R 97. The Engineer will take immediate possession of the samples. Samples not provided to the Engineer immediately will not be used for acceptance.

1. Gradation, Binder Content, and Air Void Content. Perform gradations according to AASHTO T 30. A wet wash will not be performed. The requirements in the Table below apply to mixes with and without pay adjustments.

   During production of a specific mix, if two consecutive tests do not meet the gradation requirements of the Table below or if one test exceeds double the tolerance on the control sieve, cease production of that HMA mix. The Engineer will allow production to resume after the Contractor completes a successful trial batch for that class of mix. Acceptance sampling will resume with the subsequent sublot or as determined by the Engineer.

Gradation Requirements

	Class 19.0	Class 12.5	Class 9.5	Class 4.75
25.0 mm (1 in.)	100%	100%	100%	100%
19.0 mm (¾ in.)	90% – 100%	100%	100%	100%
12.5 mm (½ in.)	90% max	90% – 100%	100%	100%
9.5 mm (⅜ in.)	—	90% max	90% – 100%	95% – 100%
4.75 mm (#4)	—	—	90% max	85% – 100%
2.36 mm (#8)	±5% from design	±5% from design	±5% from design	—
1.18 mm (#16)	—	—	—	±5% from design
0.075 mm (#200)	≥ 2%	≥ 2%	≥ 2%	≥ 2%
Control Sieve	2.36 mm (#8)	2.36 mm (#8)	2.36 mm (#8)	1.18 mm (#16)

The Engineer will determine the binder content according to AASHTO T 308 and the air voids according to AASHTO T 269. The plant shutdown criteria in the Table below will apply for binder content and air voids that exceed the following tolerances.

Plant Shutdown Criteria

Pay Adjustments	Shutdown Criteria	One Test	Two Consecutive Tests
With Pay Adjustments	Optimum Binder Content	±0.6%	—
	Design Air Voids	±2.0%	—
Without Pay Adjustments	Optimum Binder Content	±0.6%	±0.4%
	Design Air Voids	±2.0%	±1.0%

Any combination of gradation, binder content, and voids that exceed specifications on two consecutive

tests requires the Contractor to shut down the plant. Do not sample trial batches until acceptance testing is complete. The Engineer will allow production to resume after the Contractor completes a successful trial batch for that class of mix.

2. Mix Production — Lots and Sublots. A standard sublot is 600 tons for HMA sampled at the plant for each production run. A standard lot for each mix is 10 sublots. A sample will be randomly selected and tested for each sublot. At least five sublots will be used when calculating pay adjustments.

   If the quantity of HMA needed to finish a production run is projected by the Contractor to be less than the standard sublot size of 600 tons, the projected tonnage may be used to select a random sample. If the projected tonnage is not produced or a random sample is unable to be taken, the Engineer may select a sample at the end of the run or at the paver. If no sample is taken, the tonnage will be added to the previous sublot.

   Additional samples may be taken at the discretion of the Engineer.

   Gyratory cores and theoretical maximum density samples will be retained by the Engineer for two weeks after the results are reported to the Contractor.

3. Adjustments to Lots. If less than five sublots are tested after the end of the final standard lot, they will be added to that lot. Five or more sublots tested after the end of the final standard lot will constitute a separate lot.

4. Plant Pay Adjustments. If a class of HMA is designated with pay adjustments, the pay adjustments for deviation from the optimum binder content (established by the mix design) in the Table below and the design air void content in the second Table will apply.

OBC Pay Adjustments

Deviation from Optimum Binder Content	Pay Adjustment
Less than or equal to 0.1%	+2%
0.2%	+1%
0.3%	0%
0.4%	-5%
0.5%	-15%
0.6%	-30%
0.7%	-40%
Greater than 0.7%	-50% or Remove and Replace*

Air Void Pay Adjustments

Deviation from Design Air Void Content	Pay Adjustment
Less than or equal to 0.5%	+1%
0.6% to 1.0%	0%
1.1% to 1.5%	-5%
1.6% to 2.0%	-10%
2.1% to 2.5%	-30%
2.6% to 3.0%	-40%
Greater than 3.0%	-50% or Remove and Replace*

** The decision to make 50% payment or remove and replace will be made by the Engineer.*
Note: All deviation values will be rounded to the nearest 0.1 percent before applying pay adjustments.

5. Calculation of Pay Adjustments for Production Binder and Air Void Content. For each test, absolute deviations will be used when determining binder and air void content pay adjustments. Absolute deviations are the values of deviation regardless of sign (±). The average of the absolute deviations from the optimum binder content of all sublots in each lot will be used to determine the appropriate pay adjustments for the lots. The same will apply for air void content. No payment will be made for any pavement that is removed.

6. Independent Assurance Testing. The Department will perform this testing according to the RIDOT publication, "Schedule for Sampling, Testing, and Certification of Materials."

401.03 CONSTRUCTION METHODS.

401.03.1 HMA Mixing Plant.

Ensure that the HMA plant complies with AASHTO M 156 and Section 941 e-Ticketing.

401.03.2 Hauling Equipment.

Ensure that trucks or other equipment used for hauling HMA have tight, clean, smooth, metal beds, which have been thinly coated with an approved release agent. Do not apply diesel fuel or other petroleum based material to any portion of the vehicle that contacts the HMA. For each truck, provide a solid cover of canvas or other suitable material that protects the mixture from the weather and covers the entire length and width of the truck body.

Load tri-axle trucks using a minimum of two drops, front and back. Load trailers using a minimum of three drops with the center drop always occurring last.

Do not clean equipment (vehicles, truck beds, etc.) in areas to be paved.

A material transfer vehicle (MTV) is required for the construction of all HMA friction, surface, intermediate, and base courses on all limited access highways listed in the Table below. Use the MTV on travel lanes, auxiliary lanes, climbing lanes, acceleration and deceleration lanes, ramps, collector/distributor roads and service roads. Ensure that the MTV independently delivers HMA from the hauling equipment to the paving equipment. Install a paving hopper insert with a minimum capacity of 14 tons in the hopper of conventional paving equipment when an MTV is used.

As a minimum, use an MTV that has a high-capacity truck unloading system that will receive HMA from the hauling equipment, a storage system in the MTV with a minimum capacity of 14 tons of HMA, and a discharge conveyor that can swivel to either side to deliver the mixture to the paver while allowing the MTV to operate from an adjacent lane. In addition, ensure that the paving operation contains a remixing system to blend the mixture before placement. Adjust the speed of the paver and MTV to coordinate with the availability of HMA. Failure to keep the MTV supplied with HMA may because to cease paving operations for this work. The Engineer may suspend paving operations if more than two stoppages occur. Operate the MTV from an adjacent lane unless otherwise permitted by the Engineer.

When an MTV is used on a Project, investigate the possible movement of the fully or partially loaded MTV on the Project. If there are any structures that the MTV will traverse, request an Overweight Permit Check from the Department. Provide a copy of the request in writing to the Engineer, and include the axle configuration, weights, and the Project limits. Do not restart operations until permission is received from the Engineer.

The following Table is a list of roadways requiring the use of an MTV.

Route Number	Limits
I-95	Connecticut State Line to Massachusetts State Line
I-195	I-95 to Massachusetts State Line
I-295	I-95 to Massachusetts State Line
US Route 1	Prosser Trail to Wakefield Cut-Off
RI Route 4	Route 1 to I-95
US Route 6	Route 102 to Route 101; Route 10 to I-295
RI Route 10	Park Avenue to Route 6
US Route 6/RI Route 10	Magnolia Street Bridge to I-95
RI Route 24	Route 114 to Massachusetts State Line
RI Route 37	Natick Avenue to Post Road
RI Route 78	Route 1 to Connecticut State Line
RI Route 99	Route 146 to Mendon Road
East Shore Expressway	I-195 to Wampanoag Trail
RI Route 114	East Shore Expressway to Forbes Street
RI Route 138	Route 1 to Admiral Kalbfus Road
RI Route 146	I-95 to Reservoir Road
RI Route 146	Route 146A to Massachusetts State Line
RI Route 403	Route 4 to Quonset Point
Airport Connector	I-95 to Post Road
Henderson Bridge Access Roadway	Waterman Street/So. Angell Street to Broadway

401.03.3 Pavers.

Spread mixtures using a self-powered paver capable of spreading to line, grade, and crown.

Use auger extensions when the end of the screed extension is more than 2 ft from the end of the augers.

Ensure that the screed and screed extenders continually vibrate while placing the mixture. Ensure that the screed is heated to maintain the HMA at the required placement temperature.

Use automatic screed controls with sensors on both sides of the paver in accordance with the manufacturer's instructions. Ensure that the controls are capable of sensing grade from an outside reference line, sensing the transverse slope of the screed and providing the automatic signals that operate the screed to maintain the desired grade and transverse slope. Ensure that the sensors can operate from a ski-type device or reference beam of not less than 25 ft in length. Ensure that the sensors can operate from a reference line, unless the ski-type device or reference beam can ride on an adjacent, newly placed lift of HMA.
Provide reference lines for the control of horizontal alignment, subject to the approval of the Engineer.
Ensure that the transverse slope controller can maintain the screed at the desired slope within ±0.1 percent. Ensure that the paver is equipped with automatic feeder controls, properly adjusted to maintain a uniform depth of materials ahead of the screed.

Manual operation will be permitted in the construction of irregularly shaped and minor areas or where otherwise allowed by the Engineer.

401.03.4 Conditioning of Existing Surfaces.

Remove all striping on existing surfaces before applying the tack coat. Provide a thin, even coating of tack to surfaces of curbs, gutters, vertical faces of existing pavements, and all structures that will contact the HMA.

Avoid the splattering of surfaces that will not contact the HMA.

When a tack coat is required, provide a type and grade and application method that conforms to SECTION M03 and SECTION 403.

401.03.5 Spreading and Finishing.

Lay the mixture on an approved clean surface, which has been spread and struck off to the established grade and elevation. Use HMA pavers to distribute the mixture either over the entire width or over a partial width approved by the Engineer. **Ensure that transverse joints are clean, smooth, uniform, vertical, and constructed using a fixed depth road saw.**

Ensure that the practices and guidelines for placing HMA comply with the Asphalt Institute Publication MS-22, "Construction of Hot Mix Asphalt Pavements."

Do not allow unnecessary walking on the uncompacted HMA mat.

Before beginning a new lane, heat the screed to the proper operating temperature and remove any clumps of cold material in the paver hopper.

Do not allow trucks or other equipment on freshly placed HMA, unless permitted by the Engineer.

Where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, place the mixture as close to its final position as possible. Spread, rake, and lute with hand tools to minimize segregation and provide the required compacted thickness.

Protect catch basins to prevent HMA from entering the basin and to enable the grate to be easily removed after paving. If paving results in HMA entering the catch basin or in bonding the grate to the frame preventing its normal removal, remove all HMA from the catch basin and clean the grate to debond the two.

If unforeseen circumstances cause the paving operation to cease, provide a minimum of three loaded trucks on site before paving will be allowed to resume.

401.03.6 Compaction.

Immediately after the HMA has been spread, struck off, and surface irregularities adjusted, uniformly compact by rolling.

Roll the surface when the mixture is in the proper condition and when rolling does not cause undue displacement, cracking, and shoving.

Compact HMA used on bridge decks with an oscillatory roller.

Compact HMA used as leveling course with a pneumatic roller.

Use a minimum of two rollers for all paving operations that exceed a daily total of 500 tons, except for driveway, sidewalk, and bridge deck paving operations. Provide a number, weight, and type of roller(s) sufficient to compact the mixture to the required density before it reaches the minimum compaction temperature. Use rollers in the vibratory or oscillatory mode for asphalt placed on soil. Use rollers in the oscillatory mode on bridge decks. Finish rollers may be used in static mode. Provide rollers used for compaction with a minimum operating weight of 10 tons or greater. Do not use equipment that results in excessive crushing of the aggregate.

Ensure that the speed of a roller does not exceed 5 mph.

Do not park rollers on HMA. Only stop rollers on HMA when reversing direction. When reversing direction, ensure that the action is smooth, not abrupt. Ensure that the drive wheel approaches the new mix, not the tiller wheel.

When a vibratory roller is used for finish rolling, use the roller in the static mode. Continue finishing rolling until all roller marks are eliminated. Do not allow traffic on newly placed pavement until the temperature falls below

130 degrees F.

Ensure that the motion of the rollers is sufficiently slow to avoid displacement of the hot mixture. Ensure that the wheels of steel-wheel rollers remain moist and clean to prevent adhesion of the fresh material; however, do not apply an excess of water.

If satisfactory density cannot be obtained in any lift, and if the Engineer determines that it is structurally inadequate and/or incapable of maintaining material integrity, remove and replace the area(s) at no additional cost to the Department.

Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is otherwise defective and place fresh hot mixture, which must be compacted to conform to the surrounding area. Remove and replace any area demonstrating an excess or deficiency of PGAB.

- In-Place Density for Classes of HMA not designated as "with Pay Adjustments." For HMA not designated with Pay Adjustments, ensure that the in-place density is a minimum of 92 percent of the theoretical maximum density obtained at the plant. Acceptance testing will be performed with a nuclear or non-nuclear gauge.

  If a class of HMA is designated for bridge decks, use an oscillatory roller with a minimum operational weight of 8 tons. For HMA designated for bridge decks and with Pay Adjustments, the pay adjustments will only apply to binder content and air voids. In-place density will not be used for acceptance testing.

  If a class of HMA is used for leveling, place the HMA with a paver. Use a pneumatic roller with a minimum operational weight of 8 tons. In-place density will not be used for acceptance testing. For HMA designated for leveling and with Pay Adjustments, the pay adjustments will apply only to binder content and air voids.

  If a class of HMA is designated for patching, miscellaneous work, or paved waterways, place the HMA by hand. Use a vibratory plate compactor or roller. Use a hand tamper only if approved by the Engineer. In-place density will not be used for acceptance testing.

- In-Place Density for Classes of HMA designated as "with Pay Adjustments." Compaction density will be measured using cores of in-place pavement extracted according to AASHTO R 67.
  Extract cores under the direction of and witnessed by the Engineer. Otherwise, the cores will not be used for acceptance. The Engineer will determine the location of all cores.
  Each lot and sublot for in-place density cores will be matched as near as practical to each production lot and sublot used at the plant. The average Gmm for the paving session will be used to determine the in-place density of the cores extracted for that session.
  Extract all cores after completion of rolling operations and before the paved section is open to traffic. The Engineer will take immediate possession of the cores upon extraction. If the Contractor does not obtain cores before a sublot is open to traffic, no bonus (pay adjustment resulting in more than 0 percent) will be paid for the sublot but disincentives will still apply.

  Bulk specific gravities will be determined according to AASHTO T 166, regardless of whether the absorption exceeds 2.0 percent. The Engineer will retain the cores for four weeks after the results are reported to the Contractor.

  For HMA used on bridge decks, cores will not be required or allowed.

  The Contractor may extract its own cores for QC to monitor in-place density and production quality; however, these cores will not be used for acceptance.

  - Mat Density. A standard sublot is 600 tons. A non-standard sublot is the quantity of HMA placed if there is less than 600 tons produced after the final standard sublot.

    Under the direction of and witness by the Engineer, extract two stratified, randomly selected

cores (diameters between 3.75 in. and 4 in.) from the mat for each standard sublot. One core is taken for sublots less than 450 tons. The Table below will be used to determine the minimum number of cores extracted from the mat. The center of each core used to determine mat density will be at least 1 ft away from the edge of pavement, transverse or longitudinal joints, or drainage structures.

MAT Density Core Quantities

Expected Daily Production Tonnage	Minimum Number of Mat Cores
450 or Less	1
451 – 750	2
751 – 1050	3
1051 – 1350	4
1351 – 1650	5
1651 – 1950	6
1951 – 2250	7
2251 – 2550	8
2551 – 2850	9
2851 – 3150	10

- Joint Density. Extract one joint density core for every 3000 ft or less when a joint is formed. Extract joint cores so that the center is within 2 in. of the middle of the sloped portion of a notched-wedge joint or within 1 in. of the middle of a butt joint. Ensure that cores taken from butt joints are 6 in. in diameter.
- In-Place Density Pay Adjustments. In-place density will be measured and reported as a percent of theoretical maximum density. The pay adjustments from the Table below will be made for in-place mat density.

MAT Density Pay Adjustments

In-Place Mat Density	Pay Adjustment
95.0% and greater	+2%
94.0% to 94.9%	+1%
93.0% to 93.9%	0%
92.0% to 92.9%	-5%
91.0% to 91.9%	-15%
90.0% to 90.9%	-25%
89.0% to 89.9%	-35%
Below 89.0%	Remove and Replace

The pay adjustments from the Table below will be made for in-place joint density.

Joint Density Pay Adjustments

In-Place Joint Density	Pay Adjustment
93.0% and greater	+2%
92.0% to 92.9%	+1%
91.0% to 91.9%	0%
90.0% to 90.9%	-5%
89.0% to 89.9%	-15%
88.0% to 88.9%	-25%
87.0% to 87.9%	-35%
Below 87.0%	-100%

Note: All density values will be rounded to the nearest 0.1% before applying pay adjustments.

4. Calculation of Pay Adjustments for In-Place Density.

- Mat Density. For each sublot, the bulk specific gravity (Gmb) of the mat density core(s) will be averaged and then compared to the average of the corresponding plant theoretical maximum specific gravities (Gmm) for that paving session to calculate the in-place density for each sublot. The average of the sublot densities in a lot will be used to determine the appropriate pay adjustment for that lot. Lot pay adjustments will be applied to the respective quantity of HMA in each lot.
- Joint Density. For joint density pay adjustments, a joint lot will be defined as 10 joint density results. However, if less than five joint density results are remaining after the final full joint lot is formed, they will be added to the previous joint lot. Five or more joint density results remaining after the final full joint lot will constitute a separate joint lot. A minimum of five joint density cores will be used to calculate pay adjustments. If five cores are not available, the joint density pay adjustments will not be used and the joint quantity will be added to the mat quantity.

  Calculation of in-place joint density will be determined using the Gmb of joint density cores and the project average plant Gmm of the respective mix. The average of the individual joint density results in a joint lot will be used to determine the appropriate pay adjustment for that joint lot. The calculation of material quantity used to construct the joints will be based on the joint core density, the specified thickness, a width of one ft and the total length of the joints on the Project. This quantity will be deducted from the total tonnage.

Quality control (QC) for paving operations include measurement of in-place mat and joint density using a nuclear or non-nuclear density gauge calibrated and operated in accordance with AASHTO T 343 or T 355 as applicable. The operator of the gauge shall direct and guide both the paver and roller operators to ensure conformance with density specifications. This QC operation shall be performed for all paving sessions greater than 300 tons or if the mix being placed includes pay adjustments. It is not required for leveling course but is required for all dense graded mixes, Friction Courses and PPEST.

Take acceptance cores at the direction of the Department.

401.03.7 Joints.

Ensure that the placement of the HMA is as continuous as possible. Do not allow rollers to pass over the unprotected end of a freshly laid mixture, unless authorized by the Engineer.

Stagger both longitudinal and transverse joints in successive courses so that neither is above the other. Stagger longitudinal and transverse joints a minimum of 6 in. and ensure that the longitudinal joint in the top course is at the location of the line dividing the traffic lanes. Rake any HMA that falls on the cold side of the mat onto the hot side during paving operations. Ensure that the material pushed onto the hot side of the joint remains in the joint area and is not broadcast over the pavement.

Use a notched wedge joint maker on all longitudinal drop-offs, regardless of whether they are on the left, right, or both sides of the pavement. Construct joints so that the height of the notch is the same as the nominal maximum

aggregate size. Provide a width of the sloped portion of the joint that is at least 12 in. Use a notched wedge joint maker on ramps when they are paved in two passes.

401.03.8 Pavement Samples.

As directed, cut samples from the compacted pavement for testing by the Engineer. Extract samples of the mixture for the full depth of the course at the locations directed by the Engineer.

Where samples have been taken, place and compact new material to conform to the surrounding area.

401.03.9 Weather Limitations.

Do not place HMA on any wet surface or when weather conditions otherwise prevent the proper handling or finishing of the HMA.

For lifts with a target compacted lift thickness less than or equal to 1.5 in., only place HMA when both the air and surface temperature in the shade is 45°F or greater. If an approved WMA (warm mix additive) is used, ensure that the temperatures are 40°F or greater. For lifts with a target compacted lift thickness greater than 1.5 in., only place HMA when both the air and surface temperature in the shade is 40°F or greater. Do not place HMA on frozen ground.

Ensure that the HMA mat is at least 265°F when placed. If, after mobilization, the weather limitations have an impact, assume all costs associated with the stopping, delaying, or canceling of operations.

401.03.10 Cold-Weather Paving.

If the existing pavement is removed before the winter shutdown, do not close the Project for the season until a new HMA layer has been placed and striped with temporary epoxy pavement markings. If paving cannot be performed because temperatures do not rise above 40oF, then the pavement will be designated as temporary. Repave that segment of roadway in the spring when temperatures exceed 40oF.

401.03.11 Drop-Offs.

Longitudinal Drop-Offs. A longitudinal drop-off is the difference in elevation between the top of recently placed or milled HMA pavement and the top of adjacent ground or pavement. Ensure that drop-offs on recently placed pavements conform to Subsection.401.03.7. Construct all longitudinal drop-offs using a notched wedge joint maker, unless otherwise approved by the Engineer. See the RIDOT Standard Details.

a. Transverse Drop-Offs. Transverse drop-offs occur as follows:

- Pavement Removal. A transverse drop-off occurs when pavement removal operations begin or end on a working day. The drop-off is the difference in elevation between the bottom of the excavated pavement and the top of the existing pavement.

- Pavement Overlay. A transverse drop-off occurs when pavement overlay operations begin or end on a working day. The drop-off is the difference in elevation between the top of the overlay pavement and the top of the underlying pavement or soil. Construct drop-offs using a bond breaking material between the drop-off and the underlying pavement or soil.

If traffic is allowed across any transverse drop-off before the resumption of pavement removal or pavement overlay operations, provide tapers as follows:

- Construct all tapers with HMA conforming to the requirements of SECTION 401.

- For Posted Speeds of 35 mph or Less. Transverse drop-offs in place at the end of a working day shall be graded at a slope not steeper than 2 feet horizontal to 1 inch vertical.

- For Posted Speeds Greater than 35 mph. Transverse drop-offs in place at the end of a working day shall be graded at a slope not steeper than 5 feet horizontal to 1 inch vertical.

- Place BUMP signs according to the Manual on Uniform Traffic Control Devices for each drop-off for each direction of traffic.

- Before the resumption of pavement overlay operations, remove the transition slope as follows: Saw cut the pavement overlay back approximately 6 in. to expose a fresh, full thickness vertical face. Brush paint or pressure spray this face with tack coat, after which the HMA paving may resume. The sawcut work will be considered incidental to pavement operations.

401.04 METHOD OF MEASUREMENT.

401.04.1 Measurement of HMA Pavement.

HMA pavements will be measured by the number of tons placed.

a. Determination of Thickness. Before the determination of the in-place thickness, ensure that the roadway exhibits acceptable workmanship and that all defects have been corrected. The placed thickness of HMA pavement will be determined by cutting or coring holes. For courses with in-place density cores specified, the thickness of the density cores will be used to determine the in-place thickness. For courses placed on bridge decks, bike paths, or sidewalks, neither final nor density cores will be required.

   Cores will be measured according to ASTM D3549, "Standard Test Method for Thickness or Height of Compacted HMA Paving Mixture Specimens." The depth measurement will apply to the full width of the lane. Measurements will be made at random locations as determined by the Engineer.

   For the determination of thickness, a shoulder width of 8 ft or greater will be considered to be a separate lane of the roadway. A shoulder width of less than 8 ft will be considered part of the adjacent lane. For cores taken by the Contractor, fill all holes with a compacted, dense HMA that is acceptable to the Engineer. If required by the Engineer, maintain and control traffic while pavement samples are taken and while the holes are being filled and compacted.

a. Adjustment of Tonnage Quantity. The pavement thickness will be considered acceptable if both of the following requirements are met:

   - The total HMA tonnage delivered and placed does not exceed the tonnage calculated from the approved area measured from the final surface course width by the Project length and the specified pavement thickness by more than 5 percent.

   - When "Specification Conformity Analysis," FHWA Technical Advisory T5080.12," dated June 23, 1989, is applied to the entire roadway or sections thereof as determined by the Engineer, at least 80 percent of the total HMA pavement will have a thickness that meets the minimum pavement thickness. The minimum pavement thickness is that contained in the Contract minus ½ in. (e.g., a total pavement thickness of 7 in. will have a minimum pavement thickness requirement of 6.5 in.).

   If the first requirement is not met, no payment will be made for all tonnage exceeding 5 percent, unless unusual field conditions are present and documented (e.g., pavement rutting).

   If the second requirement indicates that the pavement thickness is deficient, place a correction course, with the permission of the Engineer and at no cost to the State, not less than 1 in. in depth after compaction, provided that an acceptable grade and cross section can be achieved. Where an acceptable grade and cross section cannot be achieved through the above means, reconstruct by cutting back and into the pavement a sufficient distance to permit the placement of an acceptable depth, and place new material to achieve the proper depth, cross section, and profile. Where a corrective course is placed or reconstruction of the pavement is performed, these areas will be measured again as though originally constructed. No compensation will be made for the material removed; or removal of materials and disposal thereof; or for restoration of the affected supporting base or adjacent construction; or for traffic

control; or for adjusting all utility appurtenances in the roadway; or for correcting pavement striping. Compensation will be made for the additional pavement correction course accepted in place.

Determination of the quantity to be used for adjusted payment or exclusion for payment will be based on tons per square yard per inch thickness as determined using in-place density cores or 96 percent of the plant core (AASHTO T245) densities if in-place densities are not available. If both in-place and plant core densities are not available, 94 percent of the plant theoretical maximum density results will be used.

Sweeping and cleaning, as included in the items covered by this Section, only refers to the normal removal of dust, debris, etc.

Work described in Subsection 401.03.4 will be paid for at the Contract unit prices for the material used.

b. Tolerance Limitation. Electronic tickets marked "Delivered" by the Department's representative at the point of placement will be used in the determination of total tonnage delivered and placed. Payment will be made at the Contract unit bid prices with pay adjustments for all accepted HMA up to 105 percent of the Contract quantity tonnage. Accepted HMA quantities above 105 percent and up to 110 percent of the Contract quantity tonnage will be paid at 50 percent of the Contract unit bid price and, with the resultant adjusted price, will be further modified by additional pay adjustments as applicable according to the following formula:

   Pay adjustments will apply to 50 percent of the Contract unit bid price for quantities above 105 percent and up to 110 percent. No payment will be made for quantities above 110 percent.

401.04.2 Measurement of HMA Preparation.

HMA preparation will be measured by SY. This includes asphalt emulsion tack coat, cleaning and sweeping, removal and disposal, micro milling and removing pavement markings.

401.05 BASIS OF PAYMENT.

The Department will pay for the in-place, completed and accepted quantities at the Contract unit prices as follows.

Pay Item	Pay Unit
Hot Mix Asphalt	Ton
Hot Mix Asphalt Preparation – Partial Depth	SY
Hot Mix Asphalt Preparation – Full Depth	SY

The price for HMA constitutes full compensation for all labor, materials, and equipment, and all other incidentals required to finish the work, complete and accepted. Includes labor & materials for asphalt berm.

The price for HMA Preparation – Partial Depth constitutes full compensation for all labor, materials, and equipment, including cleaning and sweeping, micro milling, removal & disposal of flexible pavement, removing pavement markings, saw cutting of pavement, placement and subsequent removal of temporary covers and structures, tack coat, and all other incidentals required to finish the work, complete and accepted.

The price for HMA Preparation – Full Depth constitutes full compensation for all labor, materials, and equipment, including cleaning and sweeping, saw cutting of pavement, removal & disposal of flexible pavement and rigid base, scarifying, mixing, pulverizing, spreading, reshaping, calcium chloride and water for compaction and dust control, regrading, rolling, compacting, trimming and fine grading of subgrade and subbase, the removal and disposal of unsuitable materials, hauling or other handling of recyclable materials off-site, the movement of surplus asphalt-stabilized base material from one location to another within the Project limits, placement and subsequent removal of temporary covers and structures, tack coat, and all other incidentals required to finish the work, complete and accepted.

Pay adjustments for binder content, air voids, and in-place density will be added together to determine a final pay adjustment for both the mat and the joint. If more than one pay adjustment is negative, then only the most negative adjustment will be added to the remaining non-negative adjustments to determine the final pay adjustment. Pay adjustments will be addressed using Item Code 416.0100. Disincentives will be addressed using a Report of Change.

All construction associated with drop-offs and the installation and removal of tapers is incidental and is not paid for separately.

Fines for Joints and QC are addressed in Section 110.

SECTION 601
PORTLAND CEMENT CONCRETE

Remove Section 601 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024 in its entirety and replace with:

601.01 DESCRIPTION.

This work consists of furnishing, placing, curing, and finishing Portland cement concrete for bridges, pavements, structures, and incidental construction.

Concrete consists of a homogeneous mixture of Portland cement, coarse aggregate, fine aggregate, air entrainment, water, chemical and mineral admixtures (when used), mixed in the required proportions.

Proportion Portland cement concrete with the required cement content for each class and mix to the consistency specified.

Use the classes of concrete required for the work. The Engineer will approve all concrete mixes.

Various sizes of coarse aggregate for the classes of concrete may be combined during the batching operation in each fraction of aggregate size required to obtain the specified gradation. When testing aggregates to determine compliance with a specified gradation, fractions will be tested separately and combined mathematically or combined mechanically in predetermined proportions and tested.

601.02 MATERIALS.

601.02.1 Portland Cement.

Provide Portland cement that conforms to **SECTION M02** and is listed on the Department's Approved Materials List.

For bridge projects, provide one brand of Portland cement and use for all visible portions of a structure; however, this is not required for interior deck slabs, beams, or corresponding elements that are semi-exposed.

Provide suitable means for storing and protecting the cement against dampness.

Supply all Portland cement from mill silos that have cement that has been tested. Provide a copy of a certified Mill Test Report to the Engineer for the cement being used. Deliveries may be directed to the site or through a regional distribution base.

In addition, comply with the following:

- Provide a manufacturer's Mill Test Report, signed by the company representative having legal binding authority, with each shipment of cement. Copies of a standard form are available from the Department upon request.
- Under all steps and conditions, make delivery in weatherproofed and sealed transporting equipment. Protect all cement from moisture and contaminants. Any cement that fails to meet any of these requirements will be rejected and removed from the work. Retest any hydraulic cement stored for a period longer than 120 days according to AASHTO M85. An independent laboratory shall perform the retest at no cost to the Department, which must be approved by the Engineer before being used on the work.

601.02.2 Chemical Admixtures.

Use admixtures in Portland cement concrete that conform to **SECTION M02**. Perform all work according to the recommendations of the manufacturer. Do not use admixtures unless approved by the Engineer.

Ensure that the physical and chemical properties of admixtures are uniform throughout their use in the work.

If an admixture as furnished is not uniform in properties, discontinue its use.

If more than one admixture type or brand is used, ensure that admixtures are compatible with one another so that the desirable effects of all admixtures used will be realized.

When using a brand and type of admixture on the Department's Approved Materials List, furnish a Certificate of Compliance from the manufacturer, certifying that the admixture furnished conforms to the chemical and physical requirements. The Engineer may take samples for testing at any time.

Dispense chemical admixtures, including air-entraining admixtures, in liquid form. If more than one chemical admixture is used in the concrete mix, provide a separate dispensing measuring unit for each admixture. Ensure that dispensers for chemical admixtures have sufficient capacity to measure at one time the prescribed quantity required for each batch of concrete. Ensure that each dispenser includes a graduated measuring unit into which liquid admixtures are measured to within ±2 percent of the prescribed quantity (volume or weight, as applicable) for each batch of concrete. Locate and maintain dispensers so that the graduations can be accurately read from where proportioning operations are controlled to permit a visual check of batching accuracy before discharge. Mark each dispensing unit for the type and quantity of admixture.

Equip each liquid admixture dispensing system with a sampling device consisting of a valve located in a safe and readily accessible position so that a sample of the admixture may be withdrawn by the Engineer.

For all types of admixtures, incorporate the water content as determined by the manufacturer's recommendations when calculating the total amount free water of the concrete mix.

601.02.3 Mineral Admixtures.

Mineral admixtures such as fly ash, blast furnace slag, and silica fume may be permitted as a partial replacement of Portland cement in any concrete as approved by the Engineer. Ensure that mineral admixtures conform to **Subsection M02.06** and are listed on the Department's Approved Materials List.

Provide suitable means for storing and protecting the mineral admixtures against moisture. Mineral admixtures that become partially hydrated or contain lumps will be rejected.

Ensure that the handling and storage of all mineral admixtures conform to **Subsection 601.02.1**.

Provide the manufacturer's Mill Certificate, signed by a company representative having legal binding authority, with each shipment of mineral admixtures.

Retest any mineral admixture stored for a period longer than 120 days for compliance with the required specifications. An independent laboratory shall perform the retest at no additional cost to the Department, which must be approved by the Engineer before use on the work.

601.02.4 Aggregates.

Provide coarse and fine aggregates that conform to **Subsections M01.05** and **M02.02**.

Obtain aggregates from sources that have been previously tested by the Department. Results and information on the tests may be obtained from the Engineer upon request. If the Contractor proposes to obtain aggregates from sources that have not been tested by the Department, comply with the following:

- Notify the Department three months in advance of use, including test results according to **SECTIONS M01** and **M02**. An AASHTO accredited laboratory shall perform the test, which must be signed by a Rhode Island Registered Professional Engineer.
- Submit the results of tests based on ASTM C295, Petrographic Examination of Aggregates for Concrete for the proposed aggregates. An AASHTO accredited laboratory shall perform the tests,

which must be signed by a Rhode Island Registered Professional Engineer.

- Provide a sufficient quantity of aggregate samples to the Engineer for verification testing three months in advance of use.
- Assume all costs for sampling and testing, except for the cost of verification testing, which will be borne by the Department.

Test all proposed aggregates and produce concrete that has freeze-thaw durability of 80 percent as determined by the relative dynamic modulus (ASTM C215, Transverse Method) at 300 cycles as tested according to ASTM C666 - Procedure A, as modified by the Department. Copies of the modifications may be obtained from the Engineer upon request.

Handle and transport aggregates from stockpiles or other sources to the batching plant to ensure a uniform grading of the material.

Ensure that the batch plant site, layout, equipment, and provisions for transporting material provides a continuous supply of material to the work. Buildup stockpiles in layers of not more than 3 ft in thickness. Ensure that each layer is in place before beginning the next. Do not allow any layer to cone down over the next lower layer.

Provide safe and suitable facilities for obtaining and storing samples of aggregates. Ensure that the facilities provide safe access to the samples.

Do not stockpile aggregates together from different sources and of different gradings. Do not use aggregates that have become segregated, mixed with foreign materials, or contaminated by aggregates of different gradings. Stockpile or bin for draining all aggregates produced or handled by hydraulic methods at least 12 hours before being batched. Rail shipments requiring more than 12 hours will be accepted as adequate binning only if the car bodies permit free drainage. If the aggregates contain a high or nonuniform moisture content, the Engineer may require storage or stockpile periods in excess of 12 hours.

601.02.5 Water.

Ensure that water used in mixing and curing concrete conforms to **Subsection M02.07**.

601.03 CONSTRUCTION METHODS.

601.03.1 Proportioning.

- General. Ensure that all concrete used on State of Rhode Island projects is air entrained. Adhere to the classes and proportions of materials per cubic yard of concrete in the following Table.

Classes and Proportions of Concrete Materials

Class[1,5,9]	**B**	**A**	**XX**	**HP**	**MC[2]**	**Z**	**X**
Minimum Cementitious Content[3], lb/cu yd	400	400	500	500	500	500	500[11]
Maximum Cementitious Content[6], lb/cu yd	700	700	700	700[6]	600	700	700
Maximum w/cm	0.55	0.45	0.42	0.40	0.40	0.42	0.40
Acceptance Criteria							
Consistency Range[4], AASHTO T119 Slump, in.	2 - 4	2 - 4	2 - 4	2 - 4	2 - 4	< 1	2 - 4
AASHTO T23 Minimum, Compressive Strength, psi							
28 days	3000	3000	4000	5000	3500	5000	5000
56 days	—	—	—	—	5000	—	--
Air Content Range, AASHTO T152, %	5 - 9	5 - 9	5 - 9	5 - 9	5 - 9	—	5 - 9
Concrete Prequalification Criteria[7]							
Surface Resistivity, (4 in. × 8 in. cylinder) AASHTO T358, k-cm (minimum)							
28-day standard cure	—	—	—	15	15	—	--
56-day standard cure	—	—	—	21	21	—	--
Maximum 28-day drying shrinkage,[8], AASHTO T160, %	—	—	—	-0.04	-0.04	—	--
Aggregate Prequalification Criteria[9]							
Maximum 14-day expansion ASTM C1567, %	—	0.1	0.1	0.1	0.1	0.1	0.1

Footnotes:

1. *A single concrete mixture may be used for multiple classifications if performance and prequalification criteria are satisfied.*
2. *Class MC concrete may have a total supplementary cementitious content of 75 percent by weight of total cementitious material when using either ground-granulated, blast-furnace slag meeting the requirements of AASHTO M 302, or combinations of slag and other supplementary cementitious materials. Maximum cement replacement by fly ash or other mineral admixture meeting requirements of AASHTO M 295 is 30 percent by weight. Maximum cement replacement by silica fume meeting the requirements of AASHTO M 307 is 7 percent by weight.*

3. *Portland cement and all other mineral admixtures.*
4. *Slump range measured at the point of discharge. Do not exceed a slump of 4 in. for surfaces sloped greater than 4 percent. If additional workability is desired, the Engineer may allow an increase of the maximum specified slump to 6 in. if an AASHTO M 194 Type A - Water Reducing Admixture is used, or an increase of up to 9 in. if an AASHTO M 194 Type F or G - High Range Water Reducing admixture is used.*
5. *AASHTO M 194 Type F or G - High Range Water Reducing Admixture is required when concrete will be placed by pumping equipment.*
6. *The maximum cementitious content for Class HP may be exceeded for the fabrication of precast/prestressed concrete structures as approved by the Engineer.*
7. *Concrete prequalification testing will not be required for the following concrete items — Flared Ends, Highway Bounds, Fence Post Footings, Guardrail Anchorage, Unreinforced Footings, Paved Waterways, Thrust Blocks, Precast Elements for Collars, Catch Basins, Manholes, Drop Inlets, Sumps, Electrical Handholes, Curbing, Pipe, Headwalls, End-walls, High-Capacity Inlets, and Temporary Traffic Barriers.*
8. *Drying shrinkage prequalification is not required for precast/prestressed structures.*
9. *Aggregate prequalification is required for all concrete classifications.*
10. *Self-Consolidating Concrete (SCC) may be used for all classes of concrete except for Classes B and Z. Ensure that SCC meets all mix performance requirements listed in the Table for the respective concrete class. Test SCC for slump flow according to ASTM C1611; ensure that the visual stability index (VSI) is 0 in. or 1 in.*
11. *Class X is used only for precast drainage structures.*

- Design and Approval of Concrete Mixtures. Design the concrete mixtures for each class of concrete specified. Proportion the concrete mix components using the absolute volumes method according to the requirements for each class as specified herein and methods in the American Concrete Institute's *Manual of Concrete Practice*, latest edition; Standard 211.1, "Recommended Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete"; and Standard 301, "Specifications for Structural Concrete in Buildings – Section 4.2.3."
    - Step 1. Laboratory Testing. At least 60 days before production, submit in writing the concrete mix design on Department forms and trial batch reports supported by laboratory test data from an AASHTO accredited laboratory to the Engineer for review.

      Provide the following information in the trial batch test reports:

        + Contractor/testing laboratory name
        + The coarse and fine aggregate gradations and sources
        + The fine aggregate fineness modulus (FM)
        + Any other pertinent information (e.g., aggregate specific gravities, unit weights, absorptions, any other material properties)
        + Date of mixing
        + Mixing equipment and procedures used
        + The size of batch in cubic yards
        + Weight/volume, type, source/manufacturer of all ingredients used in the mix

+ Slump/spread

+ Air content of the mix

+ Concrete temperature

+ Unit weight of fresh concrete

+ Curing method, age at time of testing, and compressive strength of concrete

Note: Ensure that all testing conforms to the applicable AASHTO and/or ASTM requirements listed in these Specifications.

For original copies of concrete mix designs and trial batch reports submitted for approval to the Department, provide an original Rhode Island Professional Engineer's stamp and signature.

○ Step 2. Trial Runs. Once the concrete mix design has been reviewed and no exception taken by the Engineer, conduct trial runs before production using the mix design's component materials and proportions, including the amount of admixtures that will be necessary to meet the specifications and produce concrete of the required plasticity, workability, air content, compressive strength, flexural strength, or any other specified concrete property. Conduct the trial runs by employing the concrete batch plant, mixer, and handling equipment proposed to use in production. Calibrate all equipment employed in the batching, mixing, transporting, and testing, and meet the requirements listed herein before initiating the trial runs. Pursue the goal of producing concrete using the maximum amount of water and air content specified in the submitted mix design during the trial runs. Notify the Engineer at least 48 hours in advance of performing the trial runs so that the test procedures can be witnessed.

Once the concrete temperature, slump, and air content are tested and compliance with the Specifications has been established, the Engineer will fabricate compressive strength specimens to be tested by the Engineer.

When all specified concrete parameters have been met, the Engineer will accept the proposed mix design for production.

The accepted mix design proportions will govern during the progress of the work.

Do not make any changes in the sources or proportions of the materials, including aggregate size, without written approval of the Engineer. Do not use new materials until the Engineer approves a revised mix design and new proportions based on a trial batch and laboratory tests and a minimum 3 cu yd batch plant trial run. Trial batch laboratory testing shall be conducted by an AASHTO accredited laboratory at no additional cost to the Department. The testing requirements are:

+ No testing is required for changes in admixture dose provided that the proposed dose does not exceed the manufacturer's recommendations.

+ Slump, air content, concrete temperature, and unit weight are required for all modifications.

+ 28-day (56-day for Class MC) compressive strength is required for all modifications.

+ AASHTO T358 and AASHTO T160 testing is required for any change to cementitious material source, cementitious material proportion, or water quantity for concrete Classes HP and MC.

+ ASTM C 1567 is required for all concrete classes for the following changes:

aggregate source

aggregate size

single aggregate proportions greater than 300 lb/cu yd

cementitious material source

cementitious material proportions

water content

- Heat development, as determined by Adiabatic Temperature Rise or calorimetry, is required for any change in cementitious material content or source for Class MC concrete.

- Concrete Prequalification Requirements. Proportion all concrete mixtures to meet the minimum prequalification requirements in the Table in Para. a. The Concrete Producer shall conduct all prequalification trial batches and prequalification testing using the materials in the submitted mix design. Trial batch and prequalification testing shall be performed by an AASHTO accredited laboratory. The Concrete Producer shall submit complete mixture proportions and prequalification test results of all plastic and hardened concrete properties in Para. b and the Table in Para. a to the Engineer for review. The Engineer reserves the right to perform testing for any of the specified prequalification properties.

  - Ensure that concrete mixtures have an AASHTO T358 surface resistivity greater than or equal to the value in the Table in Para. a for the class of concrete. Report a minimum of two 4 in. × 8 in. cylinder specimens for the AASHTO T358 testing.

  - Ensure that concrete mixtures have a 28-day drying shrinkage value less than the value in the Table in Para. a for the class of concrete. Determine drying according to the procedure in AASHTO T160 with the following clarifications: Specimens are 3 in. × 3 in. × 11.25 in. prisms. Moist cure all specimens in a saturated lime water bath for seven days before exposure to the drying environment. The specimen length is taken upon demolding after the curing period and weekly for 28 days while placed in the drying environment. Calculate the shrinkage value after 28 days of drying as the percent change in length from the time the specimen is removed from curing.

  - Ensure that all combinations of aggregate and cementitious materials used in concrete mixes are innocuous to alkali-aggregate reactivity as demonstrated by a mean expansion not greater than or equal to 0.10 percent after 14 days of soaking using the ASTM C 1567 test method. Ensure that this requirement is satisfied for an aggregate if the mean expansion in an AASHTO T303 test after 14 days of soaking is less than or equal to 0.10 percent.

  Test coarse and fine aggregates separately.

  A series of tests with the reactive aggregate and different cement replacement levels may be required to determine the minimum cement replacement level necessary to mitigate expansion for a given combination of materials. Do not determine the minimum replacement level by interpolation between tested levels.

601.03.2 Batching Plants and Equipment.

- General. Ensure that batching plants meet AASHTO M 157 and are certified by the National Ready Mix Concrete Association (NRMCA). Weigh cement independently on a separate scale.

Ensure that the weighing hopper is properly sealed and vented.

- Cement Silos. Provide separate silos or holding bins for each cement type and mineral admixture. Ensure that the bins protect the cement and mineral admixture from rain and moisture.

  On a weekly basis, maintain a log documenting deliveries, which will include the brand, supply, location, type, quantity, and date to document the cement on hand. Ensure that all received cement conforms to the specified quality requirements. Ensure that the log also contains data on the quantitative distribution of all cement used on both private and State projects. Submit copies of the log to the Engineer upon request, attested to by the Contractor or its representative.

- Scales. Calibrate all plant scales and water meters, including truck scales, involved in the plant operation using a registered scale company as follows:

  - Annually before use in State work
  - At intervals of not more than 180 calendar days
  - At any time ordered by the Engineer

  Note: Every 180 days, the plant owner shall submit to the Engineer a certificate from the registered scale company making the checks attesting to the accuracy of all plant scales. The certificate shall be signed by the technician or a responsible representative of the scale company making the check.

- Automation and Recordation. Ensure that plants producing Portland cement concrete for the Department conform to the following plant equipment requirements:

  - Automatic Proportioning. Produce Portland cement concrete in batch type mixing plants equipped with approved automatic proportioning devices. Ensure that the devices include equipment for accurately proportioning batches of the various components of the mixture by weight or volume in the proper sequence. Proportion cement and aggregates by weight. Proportion water and admixtures by weight or volume. Adjust the batch weights as needed when aggregate moistures change to account for the actual moisture content of the aggregates at time of use. Equip plants automatically to control the batching sequence and timing of operations. Provide an auxiliary interlock cutoff circuit to interrupt and stop the automatic cycling of the batching operations when an error in weighing occurs, when an aggregate bin becomes empty, or when there is a malfunction of any portion of the control system.

  - Recording Equipment. Equip the plant with a recording device that automatically records the required data for delivery tickets and reproduces the reading of the scale being recorded within ±0.1 percent of scale capacity.

    Provide ticket information electronically in accordance with Section 941e-Ticketing. The Engineer may also request sufficient printed copies of delivery tickets to provide a copy for the plant inspector and a copy for the Construction Manager for the permanent Project record.

  - Equipment Failure. If at any time the recording devices become inoperative, the plant may be allowed to batch materials for a period of not more than one workday from the time of breakdown, if approved by the Engineer. Written permission of the Engineer will be required for periods of operations without automatic proportioning facilities longer than one workday. As a condition for continued use with inoperative recording devices, manually record all required information on all delivery tickets.

- Batching Controls. Ensure that batching controls are electrically interlocked with the scales to prevent cycling or recycling of batching until scales tare zero. Ensure that the batching controls meet the following tolerances with respect to the various components weighed in each batch:

  + Coarse Aggregate:
    ±2.0 percent of required weight of the total coarse aggregate being weighed
  + Fine Aggregate:
    ±2.0 percent of required weight of the total fine aggregate being weighed
  + Portland Cement:
    ±1.0 percent of required weight of cement being weighed
  + Mineral admixtures:

    ±1.0 percent of required weight of mineral admixtures being weighed
  + Water:
    ±1.0 percent of required weight or volume of water being weighed
  + Admixtures:
    ±3.0 percent of required weight or volume of each admixture being used

  Ensure that the total weight of the batch does not vary more than ±1.0 percent from the theoretical design weight.

601.03.3 Concrete Mixing, Delivery, and Discharge.

Concrete may be mixed at the site of construction, at a central point, or in transit mixers, all according to the Specifications.

- Equipment — Mixers and Agitators. Provide mixers and agitators that meet the requirements of AASHTO M 157. When the concrete is truck-mixed, ensure that the volume of concrete mixed per batch does not exceed the mixer's nominal capacity as shown on the manufacturer's standard rating plate on the mixer. An exception is that an overload of up to 10 percent above the mixer's nominal capacity may be permitted, if the concrete test data for strength, segregation, and uniform consistency are satisfactory and if no spillage of concrete occurs.

  Equip truck mixers and agitators so that the number of revolutions of the drum, blades, or paddles may be readily verified. Ensure that truck mixers can measure the amount of water added during retempering such as a water meter or other method.

- Mixing and Delivery. Mix and deliver ready-mixed concrete according to AASHTO M 157. Ensure that ready-mix concrete delivery trucks are National Ready Mixed Concrete Association (NRMCA) (nrmca.org) certified via a non-expired certificate affixed to the truck in a location readily visible to the inspector (see Section 5 of NRMCA Plant Inspector's Guide).

- Discharge.

  - Time and Rate. Ensure that the elapsed time from when water is added to the mix until concrete is discharged into the forms at the site of work does not exceed 90 minutes when hauled in truck-mixers or truck agitators or 30 minutes when concrete is hauled by non-agitating equipment. Waste any concrete that is not discharged into its final place within 90 minutes (30 minutes when using non- agitating equipment) after batching.

  Approved set-control admixtures may be used to extend the maximum time of discharge for ready-mixed concrete delivered in truck mixers to 120 minutes, if the Contractor submits trial mix data

subject to the following conditions:

- + The concrete mixture proportions and prequalification test results have been approved according to **Subsection 601.03.1(b)**.
- + Set-control admixture usage is according to the admixture manufacturer's instructions and guidelines.
- + Trial batches of the concrete mixture without the admixture (control) and additional batches covering the anticipated range of admixture doses are conducted. Ensure that trial batch volume is a minimum of 3 cu yd and that trial batches are conducted at the maximum water content for the approved mixture.
- + For the control batch, only sample after initial mixing.
- + For batches containing the set-control admixture, sample after initial mixing and after 30, 60, 90, and 120 minutes. Keep the truck mixer in motion between sampling intervals.
- + Include for each trial batch data for plastic properties (slump, air content, unit weight, and temperature) after initial mixing and after 30, 60, 90, and 120 minutes of slow mixing. Report the number of drum rotations at each sampling interval.
- + If plastic properties are outside of the specification limits at any time interval, retesting after high-speed mixing for up to five minutes will be allowed.
- + Provide data for each trial batch that includes seven-day and 28-day (56 days for Class MC concrete) compressive strength results sampled after initial batching for the control and after initial batching and 120 minutes of slow mixing for batches containing the set-control admixture.
- + Ensure that trial batch test results that indicate the concrete properties of mixtures containing the set-control admixture meet specification requirements after 120 minutes of slow mixing.

- ○ Retempering. Retempering is defined as adjusting concrete properties by the addition of water or chemical admixtures after initial batching. Retempering concrete by adding water or other means may be permitted only 1) after concrete arrival and initial testing on the jobsite, 2) when delivered in truck mixers, and 3) if permitted by the Engineer. When authorized, additional water or chemical admixtures may be added to the batch materials with additional mixing to increase slump or air entrainment to meet the specified requirements, if:
  - + The maximum water-cementitious materials ratio is not exceeded.
  - + The admixture doses do not exceed the manufacturer's recommendations.
  - + All retempering and retesting operations are completed at least 30 minutes before the maximum allowable discharge time limit.

Add all admixtures at the plant. The Engineer may approve the addition of withheld mixing water at the jobsite with a metered pressurized wand. Do not add admixture during retempering that is not present in the approved mixture.

Before allowing retempering with water-reducing admixtures on the Project, conduct trial batches to simulate the impact of delayed additions as follows:

+ Both the control and retempered batch contains the same plant-added admixture dose.

+ The retempered batch has the second dose of admixture added at least 30 minutes before the maximum discharge time.

+ The combination of plant added admixture dose and retempered admixture dose does not exceed the maximum manufacturer's recommended dose.

+ Plastic properties are sampled initially at the time of retempering and maximum discharge time.

+ Specimens for strength and time of set for both the control and retempered mixture are sampled at the maximum allowed discharge time.

No trial batches are required for retempering with air entrainment admixtures.

If additional water will be incorporated into the concrete, revolve the drum not less than 30 revolutions at the mixing speed immediately after retempering the concrete and before discharge is commenced.

If additional admixtures are incorporated into the concrete, revolve the drum between 30 to 60 revolutions at the mixing speed immediately after retempering the concrete and before discharge is commenced.

Do not use concrete that is not within the specified slump or air content limits at the time of placement. Retemper the concrete at the site as permitted by the Engineer. Retempering with admixtures will be permitted only with the approval of the Engineer or when specifically provided for in the Contract.

601.03.4 Limitations for Mixing and Placement.

Do not mix, place, or finish concrete when the natural light is insufficient, unless an adequate artificial lighting system is operational.

During and immediately after placement, protect the concrete from the adverse effects of rain.

When there is a probability of air temperature 40°F or less at the time of placement, or when there is a local forecast indicating that the temperature will be below 40°F during the five-day (cast in place masonry) or 14-day (bridge deck) curing period, cold weather concreting, as defined in **Subsection 601.03.5**, will apply. At least 24 hours before placement, submit a request for approval by the Engineer to use a cold weather concreting and curing plan detailing the methods and equipment to ensure that the concrete temperature does not fall below 50°F during the curing period after placement, which is considered the protection period. Ensure that concrete mixing operations conform to **Subsection 601.03.5.**

601.03.5 Cold Weather Concrete.

- Plant Procedures. When concreting is authorized during cold weather, the aggregates and/or water may be heated by either steam or dry heat before being placed in the mixer. Ensure that the apparatus heats the mass uniformly and is arranged to preclude the possible occurrence of overheated areas that might damage the materials. Ensure that the temperature of the mixed concrete is not less than 50°F and not more than 90°F at the time of placement in the forms. Do not use frozen aggregates in the concrete.

  Stockpiled aggregates may be heated by the use of dry heat or steam. Do not heat aggregates directly by gas or oil flame or on sheet metal over fire.

  When aggregates are heated in bins, steam-coil, water-coil heating, or other methods that will not be

detrimental to the aggregates may be used. Do not use live steam on or through binned aggregates without the approval of the Engineer.

- Concrete Placement Procedures. Do not place concrete on frozen subgrade. Install sufficient heating devices under an enclosure or covering that are capable of maintaining at all times and under all weather conditions during the protection period a uniform concrete temperature of not less than 50°F. From days 8 to 14 of the concrete bridge deck curing period, maintain a minimum concrete temperature of not less than 40°F. Arrange heating devices to prevent overheating any forms or concrete. Before any concrete is placed, ensure that the enclosure and heating apparatus are as nearly complete as the placement of concrete will permit. Ensure that the minimum temperature is continuously maintained around deposited concrete for the curing period of five days (cast in place masonry) or 14 days (bridge deck) or 56 days (Class MC concrete) immediately after concrete has been placed and then reduced gradually so that the concrete will not be subjected to a sudden change in temperature. The heating period may be reduced when the concrete units will not be subjected to any appreciable bending stress from dead or live load until after seasonal conditions have permitted normal curing.

  A steam heating system may be used to supply heat during the protection period to ensure a minimum temperature of 40°F before concrete placement.

  Heat for protection may be supplied by any method that will maintain the required concrete temperature of not less than 50°F. When methods other than live steam are used, make provisions in the enclosure being heated to maintain a humid condition of sufficient vapor (maintain humidity of 100 percent) content to prevent evaporation of the moisture in the concrete.

  Provide adequate fire protection when heating is in progress and provide watchmen or other attendants to keep heating units in continuous operation. Do not use open fires.

  Maintain a daily permanent record of the concrete surface temperatures throughout the curing period with the use of a 24-hour, continuous temperature recording device. The Engineer will retain these records.

  During freezing weather, seal all keyways, anchor bolt holes, or other depressions in exposed horizontal concrete surfaces against the admission of water. Repair damage to the concrete from freezing water in the depressions if practical, or replace the concrete as directed by the Engineer.

601.03.6 Hot Weather Concrete.

Hot weather is defined in The American Concrete Institute, Standard 305. During concreting operations in hot weather, take appropriate measures to reduce the hazards of an increased rate of cement hydration, flash set, loss of water due to evaporation, high concrete ingredient temperatures, and the increased difficulty of concrete placing and finishing. Comply with the following requirements during concrete placement operations in hot weather:

- Concrete Temperature. Ensure that the temperature of the concrete at the point of discharge does not exceed 90°F.
- Cooling Materials. The Contractor may reduce the temperature of the concrete by cooling one or more of several ingredients. Use chipped or crushed ice in the mix as a portion of the mixing water on a pound for pound basis, provided that the measurement is determined at the time of placement in the mix.

  If used, melt all ice before the batch is discharged from the mixing unit.
- Concrete Placement. Immediately before the concrete is placed, cool the forms and reinforcement

steel by spraying with water. Do not allow any standing water in the concrete forms from the spraying procedures. Ensure that sufficient skilled staff and adequate equipment are available to place the concrete without delays.

- Finishing. To prevent thermal and shrinkage cracking resulting from moisture loss, use effective means to supply moisture. Ensure that finishing operations follow as closely as practical behind the placing operation so that curing may begin as soon as possible.

601.03.7 Curing.

- Curing. Ensure that the temperature on the surface of the hardened concrete does not fall below 50°F at any time during the first five days of curing.

  Initiate curing operations on all exposed surfaces immediately after the placing and finishing operations have been completed. Select a method of curing that does not damage the concrete surface before final set occurs and continue its use throughout the work, unless the Engineer determines that the curing plan results in unsatisfactory concrete curing.

  Any changes in the method of curing must be authorized in writing. When curing requires the use of water, ensure that the curing has priority for all water supply or suppliers. Failure to provide sufficient cover material or lack of water to adequately protect both curing and other requirements will result in immediate suspension of concreting operations. Do not allow the concrete to remain exposed for more than ½ hour between stages of curing and during the curing period.

- Water Method. Ensure that the concrete remains continuously wet by the application of water for a minimum period of seven days after the concrete has been placed.

  A curing medium meeting the requirements of **Subsection M02.04** may be used to retain the moisture during the curing period. When a curing medium will be used to retain the moisture, ensure that the entire surface of the concrete remains damp by applying water with a nozzle so that the flow is atomized in the form of a mist rather than a spray until the surface of the concrete is covered with the curing medium. Do not apply the moisture from the nozzle under pressure directly upon the concrete and do not allow moisture to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface.

- Curing Compound Method. Use a curing compound that complies with **Subsection M02.04**. For concrete that is treated with any additional coatings or overlays, do not cure as provided in this Section.

  Spray the surfaces of the concrete that are exposed to the air uniformly with a curing compound.

  Apply the curing compound according to the manufacturer's recommendation.

  Evaluate runs, sags, thin areas, skips, or holidays in the applied curing as evidence that the application is not satisfactory. If a clear color curing compound is used, add a fugitive dye to the curing compound to ensure complete coverage.

  Apply the curing compound to the concrete following the surface finishing operation immediately before the moisture sheen disappears from the surface, but before any drying, shrinkage, or craze cracks begin to appear. If any drying or cracking of the surface is evident, immediately apply water with an atomizing nozzle as specified above for the Water Method, and continue until application of the compound is started or resumed. However, do not apply the compound over any resulting freestanding waters. If the film of compound is damaged from any cause before the expiration of seven days after the concrete is placed for structures and 72 hours for pavement, repair the damaged portion immediately with additional compound.

Do not dilute or alter the curing compound after manufacture.

When the curing compound is shipped in tanks or tank trucks, provide a shipping invoice with each load. Ensure that the invoice contains the same information as that required for container labels.

Curing compounds may be sampled by the Engineer at the source of supply, at the job site, or at both locations.

Use the curing compound within 120 days of its manufacture.

All tests will be conducted by the Engineer according to the latest test methods of the American Society for Testing Materials.

- Waterproof Membrane Method. Spray the exposed finished surfaces of concrete with water, using a nozzle that atomizes the flow so that a mist and not a spray is formed, until the concrete has set, after which place the curing membrane. Ensure that the curing membrane remains in place for a period of not less than 72 hours.

  Use sheeting material for curing concrete that conforms to **Subsection M02.04.2**.

  Use sheeting material that has been fabricated into sheets of a width to provide a cover for the entire concrete surface. Securely cement together all joints in the sheets to provide a waterproof joint. Ensure that the joint seams have a minimum lap of 6 in.

  Securely weigh down the sheets by means satisfactory to the Engineer. Do not use rocks, sand, or loose debris as ballast.

  Should any portion of the sheets be broken or damaged before the expiration of 72 hours after being placed, repair the broken or damaged portions with new sheets properly secured into place.

  Do not use sections of membrane that have lost their waterproof qualities or have been damaged that renders them unfit for curing the concrete.

- Forms-In-Place Method. Formed surfaces of concrete may be cured by retaining the forms in place. Ensure that the forms remain in place for a minimum period of seven continuous days after the concrete has been placed, except that, for members over 20 in. in least dimension, ensure that the forms remain in place for a minimum period of five continuous days. Remove the forms no later than three weeks after the concrete has been placed.

  Ensure that all joints in the forms and the joints between the end of forms and concrete remain moisture tight during the curing period. Reseal any cracks in the forms and cracks between the forms and the concrete by methods approved by the Engineer.

601.03.8 Quality Assurance (QA).

- Concrete Manufacturing Plant Quality Control (QC).
  - General. The Concrete Producer shall establish, implement, and maintain a QC program to control all equipment, materials, and processes during concrete production. The Concrete Producer's QC program shall include sampling, testing, inspection, monitoring, documentation, and corrective action procedures during the handling, blending, and mixing operations. Develop a written Quality Control Plan (QCP) that details the Concrete Producer's QC program. Do not produce concrete without an approved QCP and a QC technician present at the plant for production. QC is not required for optionally tested items in the latest edition of the RIDOT Master Schedule of Testing. Failure to comply with the provisions of this Subsection will result in the rejection of the concrete produced until the Concrete Producer's

operations comply.

- Personnel. At a minimum, the QC staff shall include the following personnel:
  - QCP Administrator. The Concrete Producer shall employ a QCP Administrator with five years minimum of Materials QC experience and meeting one or more of the following criteria:

Professional Engineer licensed in the State of Rhode Island

Certification by the National Institute for Certification of Engineering Technologies (NICET) at Level III or above for concrete

Certification by the North-East Transportation Training and Certification Program (NETTCP) as a QA Technologist

  - For prestress concrete facilities, employ a QCP Administrator with five years minimum of prestress concrete production QC experience and meeting one or more of the following criteria:

Precast/Prestress Concrete Institute (PCI) Level III Certification for prestressed concrete production (PCI Level II for non-prestressed precast)

Certification by the National Institute for Certification of Engineering Technologies (NICET) at Level III or above for concrete

Certification by the North-East Transportation Training and Certification Program (NETTCP) as a QA Technologist

  - The QCP Administrator shall have the authority to direct all actions necessary for the successful implementation of the QCP, including administering, implementing, monitoring, and adjusting processes as necessary to ensure compliance with the Contract Documents.
  - QC Technicians. The Concrete Producer shall employ QC Technician(s) who test concrete specimens and concrete materials. QC Technicians shall possess a current certification as American Concrete Institute (ACI) Concrete Laboratory Testing Technician Level I or NETTCP Concrete Technician.

For precast/prestressed concrete facilities, employ additional QC technician(s) who sample and test concrete at the point of placement. QC technicians shall possess a current certification as ACI Concrete Field Testing Technician Grade I or NETTCP Concrete Technician.

QC technicians shall report directly to the QCP Administrator and shall be responsible for performing required QC activities and preparation of associated QC documentation.

- QC Testing Facilities and Equipment. The Concrete Producer shall maintain a separate QC laboratory and associated sampling, testing, and measuring equipment necessary to perform the required QC activities. Provide sampling, testing, and measuring devices according to specified standards and properly calibrated and verified. The Concrete Producer shall maintain records of the calibration and maintenance of all sampling, testing, and measuring equipment.

Use back-up equipment if a device is found to be defective. Ensure that defective equipment is clearly tagged and/or removed from the site until repaired and the calibration is verified. If non-standard or alternative sampling methods, testing procedures, or equipment are proposed to be

used, detail these in the QCP and approved by the Engineer before use.

- QC Activities. Implement QC activities for monitoring, inspection, sampling, and testing, which will cover all aspects that affect the quality of the concrete, including:
  - Component materials:

Fine and coarse aggregates

Portland cement

Mineral and chemical admixtures

Water

- Production and delivery equipment
- Mixing and transportation
- Formwork (precast/prestress plants only)
- Prestressing steel, reinforcement, inserts (precast/prestress plants only)
- Tensioning prestressing steel (precast/prestress plants only)
- Plastic and hardened concrete properties (precast/prestress plants only)
- Placement and consolidation (precast/prestress plants only)
- Finishing and curing (precast/prestress plants only)
- Finished product (precast/prestress plants only)

The two following Tables provide the minimum QC activities and frequencies.

Minimum Production Equipment QC Requirements

Equipment	Control Requirement	Minimum Frequency
Plant Central Mixer Blades	Visual Inspection	Annually
Plant Scales and Meters	Calibrate	Every 180 days
Batch Plant and Mixer Trucks	NRMCA Certification	Annually
Truck Water Meters	Calibrate	Annually
Tensioning Gauges	Calibrate	Precast/Prestressed Concrete — Every 180 days
Hydraulic Jacks	Calibrate	Precast/Prestressed Concrete — Every 180 days

Minimum Materials QC Requirements

Item	Control Requirement	Minimum Frequency
Fine and Coarse Aggregates	Gradation Moisture Content Visual Inspection of stockpiles and bins for segregation and contamination	Ready Mix Concrete – Daily/before start of production and randomly every 160 cu yd of concrete.
		Precast/Prestressed Concrete – Daily/before start of production and randomly every 50 cu yd of concrete.
Portland Cement	Mill Text Report – Verify conformance to specifications	Each delivery
Mineral Admixtures	Certificate of Compliance – Verify conformance to specifications	Each delivery
Chemical Admixtures	Certificate of Compliance – Verify conformance to specifications	Each delivery
Concrete Batching	Verify Mix Proportions and Batch Weights Computer maximum allowable retempering water and maximum discharge time	Each batch
Plastic Concrete	Air Content Yield (Unit Weight) Slump/Spread Concrete Temperature Air Temperature	Precast/Prestressed Concrete — First two loads then randomly every 50 cu yd for each concrete class delivered and placed on a calendar day from a single supplier.
	*Compressive Strength Specimens	Precast/Prestressed Concrete — One set for the first 50 cu yd inclusive and one set for each additional 50 cu yd or fraction thereof and as necessary for formwork removal, stress transfer and shipping (include concrete temperature, air content and slump test results)

* *The Concrete Producer shall determine the quantity of cylinders necessary for process control of construction operations.*

- Concrete Producers Quality Control Plan (QCP). The Concrete Producer shall submit a detailed written QCP to the Engineer for approval annually, at least 60 days before the first concrete placement. Provide a QCP that details the Concrete Producer's plans, policies,

procedures, and organization deemed necessary to measure and control materials, equipment, and concrete production processes.

Ensure that the QCP reflects the current status of the operations; submit proposed changes to the QCP to the Engineer. Changes must be approved by the Engineer before implementation.

At a minimum, provide a QCP that details the following:

+ Scope of QC Plan. Reference all applicable specifications, including the latest revision of the *Standard Specifications* plus all applicable compilations and supplements.

+ QC Organization. Include a QC organizational chart identifying all personnel responsible for implementing the QCP and how staff integrate and communicate within the Concrete Supplier's management structure and with the Engineer. Include a list of QC personnel and their names, qualifications, responsibilities, levels of authority, certifications, telephone contact number(s), and e-mail addresses.

+ QC Testing Facilities and Equipment. Include the location and qualifications of QC testing facilities and a list of all QC testing equipment with the frequency of calibration and verification.

+ Materials Control. Include the source(s) for all materials used in the production of Portland cement concrete and receiving, storage, and handling practices. For fine and coarse aggregates, describe stockpile management practices, including stockpile identification, separation, segregation mitigation, and loading.

+ Concrete Production. Provide a description of the concrete plant and concrete batching operations, including:

Plant location and layout

Production equipment

Method and sequence of batching

Mixing capacity and minimum mixing time

Method of monitoring ingredients and recording batches

Methods of delivery

+ QC Activities. Describe QC activities deemed necessary to control all aspects of concrete production. Include the locations, methods, frequency, and personnel responsible for conducting QC sampling, testing, and inspection. Identify lot/sublot sizes, the sample identification system, and sample storage/retention procedures. The minimum required QC activities are listed in the preceding Tables.

+ Pre-Placement (Precast/Prestressed Plants only). Include source, storage, and handling procedures for steel reinforcement, prestressing strand, hardware, and inserts. Describe procedures and equipment for tensioning and detensioning of prestressing steel strands.

+ Concrete Placement (Precast/Prestressed Plants only). Describe methods, equipment, and materials for placement, consolidation, finishing, and curing of concrete. Include sequencing of work and maximum discharge times. Include procedures for

determination of concrete strength for formwork removal and application of load. See **Subsection 809.03.8** for the curing of precast and prestressed concrete members.

+ Post Production (Precast/Prestressed Plants only). Describe procedures for post-production inspection, including product condition assessment, measurement of product geometry, and camber (as applicable). Include procedures for handling and storage of finished products.

+ Documentation. Describe documentation and reporting procedures for all QC activities. Include samples of all QC forms, reports, and control charts.

+ Non-Conformance and Corrective Action. Establish and maintain an effective and positive system for controlling non-conforming material and products as indicated by inspection and test results. Investigate the cause of any non-conformance to prevent recurrence and take prompt corrective action to correct conditions that have resulted, or could result, in the incorporation of non-conforming materials and products into the work. Positively identify all non-conforming materials and products to prevent use, shipment, and intermingling with conforming materials and products. Provide segregated holding areas, subject to the approval of the Engineer.

Include criteria for identifying non-conforming materials and products and procedures for isolation, disposition, and documentation. Include procedures and personnel responsible for directing corrective action, including suspension of work, disposal, and reclaiming or reworking of non-conforming materials and products. Detail how the results of QC inspections and tests will be used to determine corrective actions, and define rules to gauge when a process is out of control and the associated corrective action to be taken. At a minimum, establish corrective action procedures for each control requirement listed in the preceding Tables**.**

○ Records and Documentation. The Concrete Producer shall maintain complete records for all QC tests and inspections. Ensure that the QC records contain all test and inspection reports, forms and checklists, equipment calibrations, component material certificates of compliance and mill test reports, and non- conformance and corrective action reports. Ensure that the QC records will document the nature and number of observations made, the number and type of deficiencies found, the quantities of conforming and non-conforming, and the nature of corrective action taken, as appropriate. Make the QC records available to the Engineer at all times, and retain the records for the life of the Contract. The Concrete Producer's documentation procedures will be subject to approval by the

Engineer before the start of the work and to compliance checks by the Engineer during the progress of the work.

+ Forms and Reports. Document all QC inspection and test results on NETTCP forms and reports or equivalent as approved by the Engineer. Additionally, generate a non-conformance and corrective action report for each instance where test or inspection results indicate a non-conformance. Ensure that the report indicates the nature of the non-conformance and corrective actions taken to resolve it. Prepare forms and reports that are complete and on a standardized, publicly used format, and submit to the Engineer as the work progresses (or weekly, at a minimum).

+ Control Charts. Document all conforming and non-conforming test results on control charts, and ensure that they are complete and available to the Engineer at all times

during production. Present test data for Portland cement concrete on control charts, including critical gradation(s) (i.e., passing No. 4, No. 100, No. 200 sieves), air content, unit weight, and 28- day compressive strength for precast/prestressed concrete. Provide control charts that indicate lots and sub-lots, target values, and control limits, all in chronological order with a legend. The Concrete Producer may use other types of control charts as deemed appropriate and as approved by the Engineer. Complete testing and charting within 24 hours after sampling.

+ Certification. At the conclusion of the Project, the Concrete Producer shall certify to the Engineer that all Portland cement concrete and precast/prestressed products have been produced, inspected, and tested according to the requirements of the Contract specifications.

- Engineer's Acceptance Sampling, Testing, and Inspection. The Engineer is responsible for sampling, testing, and inspection for acceptance, except for furnishing the necessary materials, which shall be the Contractor's responsibility as directed by the Engineer and at no additional cost to the Department. Acceptance is based on the Engineer's inspection of the construction, monitoring of the Contractor's Quality Control Program, and acceptance test results.

Provide the Engineer with reasonable access to the records without charge.

Samples of fresh concrete for testing will be taken after all concrete retempering is performed. When sampling from within the forms is impractical, samples will be taken at the nearest accessible point in the conveyance system before placement into the forms.

Acceptance sampling and testing will meet the requirements of the Contract and the Master Schedule for the Preparation of a Project Schedule for Sampling, Testing, and Certification of Materials.

Compressive strength test specimens will be standard 4 in. × 8 in. cylinders for all placements.

- Engineer's Acceptance, Sampling, Testing, and Inspection. The following is the acceptance plan necessary to obtain samples, perform tests, and provide inspection of the work. The terms used in this acceptance plan are defined as follows:
  - Placement. For a given class of concrete, the portions of a concrete structure constructed during one continuous concrete operation.
  - Acceptance Plan. The method of taking measurements of samples to determine the acceptability of a placement of material or construction. Acceptance plans include random sampling plans.
  - Random Sample. A sample chosen so that each increment in the lot has an equal probability of being selected. The Engineer reserves the right to take more samples in addition to the samples taken according to the random sampling plan.
  - Acceptance. As defined in Para. c below.
  - Rejection. When used in this context, "rejection" means remove, dispose, and replace at no cost to the Department or, at the discretion of the Engineer, "rejection" means acceptance at a lower price determined by Pay Factors, as specified herein.
  - Lot. An isolated quantity of material from a single source or a measured amount of construction produced by the same process. For placements less than 750 cu yd, the Lot is 150

cu yd or less. For placements of 750 cu yd or greater, the Lot is 250 cu yd or less.

Lots will be determined as follows:

+ The total cubic yards for the placement will be divided by 150 for placements less than 750 cu yd, and 250 for placements greater than or equal to 750 cu yd.

+ The result will be rounded up to the next whole number. This number is the number of Lots in the placement.

+ The total cubic yards for the placement in the first bullet will be divided by the number in the second bullet to determine Lot size.

+ Each Lot size will be adjusted by rounding to the nearest 10 cu yd (or other number representing one truck load), and this adjusted Lot size will be used to determine the number of trucks in the Lot.

+ For the acceptance plan, the total cubic yards of concrete placed for all Lots will be the placement volume.

○ Sublots. Equal divisions or portions of a Lot are as defined below. The Sublot size for each Lot will be calculated by dividing each Lot into thirds rounded to the nearest truck.

+ Cylinders will be cast for each placement less than or equal to 150 cu yd of concrete delivered for each class of concrete according to the following:

1 truck = 4 cylinders from the truck

(6 cylinders for Class MC concrete)

2 trucks = 4 cylinders from 1 randomly selected truck

(6 cylinders from 1 randomly selected truck for Class MC concrete)

3 trucks = 2 cylinders from each of 2 randomly selected trucks

(3 cylinders from each of 2 randomly selected trucks for Class MC concrete)

4 thru 10 trucks = 2 cylinders from 1 randomly selected truck from the first half of the placement and 2 cylinders from 1 randomly selected truck from the second half of the placement.

(3 cylinders from 1 randomly selected truck from the first half of the placement and 3 cylinders from 1 randomly selected truck from the second half of the placement for Class MC concrete).

11 thru 15 trucks = 2 cylinders from 1 randomly selected truck from the first third of the placement, 2 cylinders from 1 randomly selected truck from the second third of the placement and 2 cylinders from 1 randomly selected truck from the final third of the placement.

+ Cylinders will be cast for each placement greater than 150 cu yd and less than 750 cu yd of concrete delivered for each class of concrete according to the following:

2 cylinders from 1 randomly selected truck from the first third of the Lot, 2 cylinders from 1 randomly selected truck from the second third of the Lot, and 2 cylinders from 1 randomly selected truck from the final third of the Lot.

+ Cylinders will be cast for each placement greater than or equal to 750 cu yd of concrete delivered for each class of concrete according to the following:

2 cylinders from 1 randomly selected truck from the first third of the Lot, 2 cylinders from 1 randomly selected truck from the second third of the Lot, and 2 cylinders from 1 randomly selected truck from the final third of the Lot.

Sidewalk placements will have a minimum of one set of four cylinders taken from one randomly selected truck per Project per day.

- Placement Acceptance Compressive Strength Evaluation. The 28-day or 56-day compressive strengths (f_c') specified in the Table in **Subsection 601.03.1** are the strengths used in the design calculations.[c] The Engineer will verify design strengths by tests made during the progress of the work according to AASHTO T23 (Standard Practice for Making and Curing Concrete Test Specimens in the Field) and AASHTO T22 (Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens). Acceptance for Class MC concrete will be based on a 56-day compressive strength test.

  Three cylinders randomly selected from each set of 4 or 6 cylinders, as determined under "Sublots," will be tested for either 28-day or 56-day compressive strengths.

Case A: Single Lot Placement.

The average 28-day or 56-day compressive strength of 3 cylinders selected from a set of 4 or 6 cylinders will be used to calculate the acceptance of the Single Lot Placement. The following formulas will be used to calculate the Placement Acceptance Test Result (PATR). The Engineer has the authority to use Formula – B for any Lot size when more than one set of 3 cylinders are tested.

Formula – A

$$PATR = \overline{X} = \frac{X_1 + X_2 + X_3}{3}$$

Symbols:

X = individual test value, which is the 28-day or 56-day compressive strength of each cylinder tested

$\overline{X}$ = the mean (average) 28-day or 56-day compressive strength of a set of 3 cylinders

PATR = Placement acceptance test result

Case B: Multiple Lot Placements

For Multiple Lot Placements, 3 cylinders from each set of 6 cylinders from each Lot will be tested for 28-day or 56-day compressive strength. The mean value of the sum of the average compressive strengths will be used to calculate the acceptance of the placement. The following formula will be used to calculate the Placement Acceptance Test Result (PATR).

Formula – B

$$PATR = \bar{X} = \frac{\bar{X}_1 + \bar{X}_2 + \cdots \bar{X}_n}{n}$$

Symbols:

$\bar{X}$ = the mean (average) 28-day or 56-day compressive strength of a set of 3 cylinders for each Lot.

X = the mean (average) of the sum of the average 28-day or 56-day compressive strength test result of each Lot.

n = number of sets

Strength Pay Factors

PATR % of (f_c')	Placement Pay Factor (PPF) (%)
95 or greater	1.00 (100)
90 to 94.9	0.90 (90)
85 to 89.9	0.85 (85)

When the PATR of structural concrete falls below f_c' submit an investigative plan stamped by a Professional Engineer holding a valid license to practice engineering in the State of Rhode Island outlining how to demonstrate that the in-place concrete's compressive strength is structurally adequate. The Engineer will approve the investigative plan before the execution of the investigation. After the investigation is completed, submit a report to the Engineer presenting the results of the Professional Engineer's analysis, testing, and conclusions and any recommended actions proposed for the concrete that did not meet the specified strength requirements.

If the Engineer's analysis demonstrates that the in-place concrete is structurally inadequate, remove the concrete and replace it at no additional cost to the Department.

The Contractor may elect to remove and dispose of any non-conforming material and replace it with new material to avoid a PPF of less than 1.00. Any such new material will be sampled, tested, and evaluated for acceptance according to the applicable requirements of **SECTION 601**.

The Engineer may reject any quantity of material that appears to be non-conforming based on visual inspection or test results. Do not use the rejected material in the work. The results of the tests on the rejected material will not be included in the calculation of the Placement Acceptance Test Results.

601.04 METHOD OF MEASUREMENT.

Portland Cement Concrete will be measured as provided for in the Contract for the specific item or items under which it is paid. If the measurement is not stipulated elsewhere in the Contract, it will be measured by the cubic yard.

601.05 BASIS OF PAYMENT.

Portland Cement Concrete, complete and accepted, will be paid for as provided in the Contract. If not stipulated elsewhere in the Contract, it is paid by the cubic yard. The payment constitutes full compensation for furnishing all labor, materials, equipment, tools, and incidentals to produce, place, and protect the concrete as specified, in addition to any requirements for specific use, except that a reduction in payment will be made for each placement of concrete not fully accepted. This reduction in payment for placement will be based on the following:

Case 1: For concrete for which a unit price is provided in the Proposal:

Unit price reduction = PPF × number of cu yd that the PATR represents × the unit bid price in the Proposal

Case 2: For concrete that is paid for as part of a lump sum item or lump sum items as listed in the Proposal:

PPF × number of cu yd that the PATR represents × the price of the various items of concrete per cubic yard as provided in the approved Contractor's lump sum breakdown.

PPF is the pay factor determined in **Subsection 601.03.8(c).**

CODE 601.9901
CONCRETE STRUCTURE HIGH EARLY STRENGTH CONCRETE

DESCRIPTION: The work included under this code shall consist of forming, placing, curing and finishing High Early Strength High Performance (HES-HP) concrete at beam closure pours, and High Early Strength (HES-XX)11 concrete at corrugated metal pipe (CMP) voids, at the locations and to the dimensions as detailed in the contract drawings or as directed by the Engineer.

MATERIALS: The materials to be used under this item code shall include the following:

Concrete: All aggregate, cement, mineral admixture, chemical admixtures, water and concrete shall conform to Part 600 of the Standard Specifications. Concrete for the beam and backwall closure pours shall be High Early Strength High Performance Portland Cement Concrete that conforms to the requirements of Class HP concrete from Section 601 of the Standard Specifications and the additional requirement of this specification.

Concrete for CMP voids and approach slab panel joints shall be High Early Strength Class XX Portland Cement Concrete that conforms to the requirement of Class XX concrete from Section 601 of the Standard Specifications and the additional requirement of this specification.

Mix Design Procedure: Approval of the concrete mix shall be in accordance with Section 601 of the Standard Specifications. The proportioning of ingredients for High Early Strength Class HP and XX concrete shall be as approved by the Engineer and as specified herein. High Early Strength Class HP and XX concrete may be modified by either chemical admixtures, mineral admixtures or both as required to obtain the concrete characteristics listed below.

Class HP:
Minimum Compression Strength (24 hours) 4,000 psi
Minimum Compression Strength (28 days) 6,000 psi

Class XX:
Minimum Compression Strength (24 hours) 3,000 psi
Minimum Compression Strength (28 days) 4,000 psi
Compressive strength shall be done in accordance with AASHTO T23.

CONSTRUCTION METHODS: All equipment, tools and requirements pertaining to the production, placement, curing, and finishing of High Early Strength Portland Cement Concrete, shall be in accordance with Parts 601 and 808 of the Standard Specifications except as modified herein.

Handling and Placement: The Contractor shall be advised that High Early Strength concrete may result in an accelerated initial concrete set. The Contractor shall take proper precautions to conduct all of the handling, testing, placement, finishing and curing of concrete before concrete initial set. Concrete that has attained initial set prior to placement will be discarded at no cost to the State. During concreting operations in hot weather, the Contractor shall take measures with the approval of the Engineer, to reduce hazards such as, increased rate of cement hydration, flash set, loss of water due to evaporation, high concrete ingredient temperatures, and the increased difficulty of concrete placing and finishing. Any concrete admixture modifications proposed by the Contractor must be submitted in writing to the Engineer for approval.

The Contractor shall allow Class HP concrete to reach a minimum strength of 3,500 psi and Class XX concrete to reach a minimum strength of 3,000 psi before opening the roadway to traffic.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: This item is incidental and will not be paid separately. Include the costs for CONCRETE STRUCTURE HIGH EARLY STRENGTH CONCRETE in the bid items requiring CONCRETE STRUCTURE HIGH EARLY STRENGTH CONCRETE.

CODE 701.9901
TEMPORARY 10" WATER MAIN RELOCATION

DESCRIPTION: This work consists of all labor, materials and equipment to furnish, install, maintain and remove temporary water service along Diamond Hill Road, across the Newell Bridge for the duration of the project. Work shall be conducted in accordance with Section 700 of the Standard Specifications, to the satisfaction of the Town of Cumberland Water Department ("Town") and the following:

The water bypass system shall maintain current water use during the removal of the existing water main and appurtenances to allow for construction of the new bridge. This shall include all piping, appurtenances, thrust blocks and all other materials associated with the temporary connections and any services until hookups to the new activated water main can me made.

The existing water main may have to be shut down in order to complete the work of this contract, only if approved by the Town and Engineer. Prior to shutdown notification, the Contractor shall locate and make a preliminary test of operation of the isolating valves as specified herein.

The Contractor shall also be responsible for notifying all affected water customers, in writing, of shutting off service at least two working days prior to shutdown, using notice cards that shall be furnished to the Contractor by the Town of Cumberland. In no case shall the water to a customer be shut off before 9 a.m., and the work is to be arranged that the water service shall be restored no later than 4:30 p.m. of the same day, nor shall water be shut off on Saturdays, Sundays or Holidays, unless permitted otherwise in writing by the Engineer. The Contractor shall give at least three days notice to the Town for a shut down. No claims for downtime will be paid due to delays in shut down caused by other Town activity.

Water pipe installations shall conform to the appropriate specifications unless otherwise approved of in writing. All new water pipes and structures within the limits of this contract shall be left in a clean and operable condition at the completion of the work. The castings of any structures, which are required to be set or reset under the pertinent items of this contract or by others shall not be set complete-in-place to the established grade until after the bituminous concrete binder course has been completed in place as directed. All pipes and other materials removed from the work site shall be properly disposed of. Compensation for this item shall be made on a lump sum basis.

Temporary service pipe shall not be installed without the prior approval of the Engineer and/or Owner. The Contractor shall submit a plan for the proposed layout of the temporary service pipe and connections to the existing distribution system for the Engineer's approval. This plan shall be drawn on a clean set of project drawings, and the temporary service pipe layout shall be consistent with the Contractor's proposed sequence of operations. Proposed changes in the layout of temporary service piping that the Contractor wishes to make, as the work proceeds shall also be submitted for the Engineer's approval. Generally the temporary service pipe shall be laid under the existing roadway and on top of the existing sidewalk. Sanitary precautions shall be satisfactory to the Engineer and shall meet all requirements of the public health authorities having jurisdiction. The installation shall be watertight. Care shall be exercised throughout to avoid any possible pollution of mains, house services, or the temporary service pipe.

Wherever relocation of water mains is required, the new pipe shall be laid up to the points of connections. All thrust blocks shall be designed, poured and cured, pipe tested, and trench backfilled before cutting the existing water main so as to require a shutdown only for the time necessary for the reconnection to the existing pipe.

Testing. The Contractor shall furnish all necessary equipment and labor for carrying out pressure and leakage tests on the pipeline in accordance with AWWA C-600 Specifications.

The pipe shall be subjected to a hydrostatic pressure of 200 psi and this pressure maintained for at least 2 hours. The following pressure restrictions shall apply:

- Not to be less than 1.25 times the working pressure at the highest point along the test section.
- Not to exceed pipe or thrust restraint design pressures.
- Be of at least 2-hour duration.
- Not vary by more than + 5 psi.
- Not to exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.
- Not to exceed the rated pressure of the valves if resilient seated butterfly valves are used.

Leakage Test - A leakage test shall be conducted concurrently with the pressure test.

The Contractor shall at his own expense make any taps and furnish all necessary caps, plugs, etc., as required in conjunction with testing a portion of the main between gate valves. He shall also furnish a test pump, gauges, and any other equipment required in conjunction with carrying out the hydrostatic tests. He shall at all times protect the new water mains and the existing water mains against the entrance of pollution material.

In the event that a leak occurs in or near the Contractor's work, day or night, the Contractor shall immediately stop all other work and/or return immediately upon notification to the site, and employ all methods required to stop the leak and restore the main to service. The temporary by-pass pipe, connections and all other materials shall be of the highest quality. The Contractor shall insulate the by-pass pipe and service connections if the by-pass pipe is in service during the winter months.

In all cases, the location, method of placing, materials employed, and sanitary precautions shall be to the satisfaction of the Town and Engineer. Once in service, the by-pass pipe will be maintained until the new water main is put in service. Any interruptions, whether caused by weather, physical damage or otherwise, shall be corrected and the service restored without additional payment.

Chlorination. Before being placed in service, all new water pipelines shall be chlorinated in accordance with AWWA C-601, “Standard Procedure for Disinfecting Water Mains”. The procedure shall be discussed with the Town of Cumberland Water Department before doing the work for this approval.

The location of the chlorination and sampling points will be determined by the Engineer in the field. The Contractor shall uncover and backfill taps for chlorination and sampling as required.

The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line.

Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced with water from the distribution system. Bacteriological sampling and analysis of the replacement water shall then be made by the Engineer in full accordance with the AWWA Manual C-601. The Contractor shall be required to re-chlorinate, if necessary, and the line shall not be placed in service until the requirements of the State Public Health Department are met.

Special disinfection procedures, such as soaking or swabbing, approved by the Engineer and the Town, shall be used in connections to existing mains, and where the method outlined above is not practical.

The Contractor must dispose of chlorinated water in accordance with State of R. I. Stormwater Regulations.

MATERIALS: All materials shall be in conformance with applicable sections of the specifications of the Town of Cumberland Water Department. The temporary service pipe, connections, appurtenances, thrust blocks and all other materials used shall be of the highest quality, and shall be fully adequate to withstand the pressures and all conditions of use. The pipe and other materials shall provide adequate water tightness. Measurement for the temporary by-pass pipe shall be made by the lump sum. All items, labor, materials and equipment will be considered incidental to this item and no additional compensation will be made.

CONSTRUCTION METHODS: Construction methods shall conform to Section 700 and other applicable sections of the Standard Specifications and the Town of Cumberland Water Department specifications.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
TEMPORARY 10” WATER MAIN RELOCATION	LS

The price so stated shall constitute full and complete compensation for all labor, materials, tools, equipment, necessary for furnishing, installing and removing the by-pass pipe, pipe material, sawcutting, excavation (including trench rock excavation and excavation of unsuitable material below grade), sheeting, shoring, and bracing for excavation and backfill, pipe bedding class B, laying, setting and joining pipe, removal of temporary caps or plugs with or without restraints, provisions of joint restraint,, backfill, temporary pavement patching, steel plating, valve fittings, leakage and pressure testing, chlorination, bituminous concrete for patches, pipe, fittings, appurtenances, thrust blocks, insulation, accessories, leakage and pressure testing and all incidentals required to finish the work, complete and accepted.

CODE 701.9902
PERMANENT 10" WATER MAIN RELOCATION

DESCRIPTION: This section includes modifying the existing water system, furnishing and installing ductile iron pipe, fittings, gate valves, tapping sleeves and valves, flexible couplings, hydrants, thrust blocks and appurtenances in reasonably close conformity with the details as indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

Submittals. The Contractor shall submit to the Engineer and the Town of Cumberland Water Department, within ten (10) days after signing of the Contract, a list of materials to be furnished, the names of the suppliers and the date of delivery of material to the site.

Certificate of Compliance: The Contractor shall, upon accepting delivery of the pipe, fittings, gate valves, tapping sleeves and valves, flexible couplings, service connections, hydrants, thrust blocks and appurtenances, provide two (2) copies of pipe manufacturer certification that inspection and all specified tests have been made and results comply with requirements of AWWA C151-76.

The Contractor shall furnish manufacturers' operating and maintenance instructions to the Engineer for equipment furnished under these Specifications.

The Contractor shall furnish special tools, if required, for normal operation and maintenance of the equipment.

MATERIALS:

General.
Cement mortar lining for pipe, fittings, as specified above, shall conform in all respects to AWWA Designation C104. The lining thickness shall be twice that specified in Section 4.7.1 of AWWA Designation C104. The seal coat shall be twice that specified in Section 4.11 of AWWA Designation C104

Rubber gasket joints for the water main pipe and fittings, as specified above, shall be in accordance with AWWA Designation C111.

All pipe, pipe fittings, accessories and appurtenances shall be new and unused.

All bolts, nuts and miscellaneous connecting pieces not provided with an approved factory coating shall be given two (2) coats of bitumastic coal-tar after installation.

Joint restraint shall be provided for all mechanical joint valves, fittings, and pipe. Joint restraint shall be MEGALUG or approved equal.

Pipe. Water main piping shall be ductile iron pipe in accordance with AWWA/ANSI Designation C151/A21.51 and to the additional requirements specified herein.

Laying length: 18 or 20 feet,
Thickness class: 52
Joint type: push on (unless otherwise noted on the plans),
Interior surface: cement lined (double thickness) and seal coat (double coat)
Exterior surface: asphaltic coating.

Underground – Type Line Markers. Underground – Type Line Markers shall be standard permanent detection tape, bright colored, continuous-printed polyethylene tap with a metallic core for easy detection of underground

installations, intended for direct burial service. Underground – Type Line Markers for Piping are required on installation of all piping.

Fittings. Fittings for water mains shall be ductile iron in accordance with AWWA/ANSI Designation C153/A21.53 and to the additional requirements specified herein.

Joint type: mechanical with restraint joint glands and shall be the "Mega-Lug" gland as manufactured by EBAA Sales Iron, Inc., or equal as manufactured by:

Clow Division
McWane, Inc.
U.S. Pipe and Foundry Co., Inc.

Pressure rating: 350 psi, Type of iron: ductile,
Interior surface: cement lined (double thickness) and seal coat (double coat)
Exterior surface: asphaltic coating.

Pipe Couplings. Pipe couplings shall be ductile iron, solid sleeves giving a watertight seal suitable for water pressure classification at least equal to that of the pipe with which they are used, as approved by the Engineer.

Gate Valves. All gate and tapping valves shall be New York Metropolitan pattern gate valves or resilient seated wedge gate valves unless otherwise specified in the Contract.

Metropolitan Pattern Valves:

- Shall meet or exceed the minimum standards and performance requirements of AWWA Standard C-500 (latest revision). The letters "MET" shall appear on the bonnet of iron bodied Metropolitan pattern valves. Both ends shall be mechanical joint in accordance with AWWA Standard C-III except tapping valves where only the outlet end shall be mechanical joint. Valves shall open to the left (counter-clockwise) as indicated by a directional arrow cast on a 2" operating nut.
- Valves shall be tested by the manufacturer for a bubble tight 200 psi differential sealing ability and a 400 psi valve open shell test.
- Valves shall be iron body, bronze mounted, double disc, parallel seat, wrench operated non-rising stem with yoke nut an O-ring seal.
- Each valve shall have makers initials, pressure rating and year of manufacture cast on the body. For purposed of standardization, valves shall be as manufactured by A. P. Smith Manufacturing Company or M & H Valve and Fitting Company or an approved equal,

Resilient Seated Wedge Valves (Including Tapping Valves):

- Shall meet or exceed the minimum materials and performance requirements of AWWA Standard C-509 (latest revision). Both ends shall be mechanical joint in accordance with C-III except tapping valves where only the outlet end shall be mechanical joint.
- Valves shall have a minimum design working pressure of 200 psi and a minimum test pressure of 400 psi. The pressure rating shall be cast on the outside of the valve.
- Valve body and bonnet shall be of ductile iron coated on all exterior and interior surfaces with a fusion bonded or thermo set epoxy conforming to AWWA Standard 550 (latest revision). The coating shall be applied with a minimum thickness of 8 MILS. The manufacturer shall certify that the coating is suitable for use in a potable water system and that the interior coating is holiday free. Reduced wall ductile iron valves are not acceptable.
- The resilient seated disc wedge shall be fully encapsulated in rubber. The rubber shall be securely bonded to the wedge including the part which houses the stem nut. The stem hole through the wedge shall be full opening top to bottom and shall also be covered in rubber. Disc wedges not 100 percent fully

encapsulated in rubber shall not be acceptable.

- The stem shall be non-rising design, Grade "E" bronze with a yield of not less than 3200 psi and an elongation of not less than 10 percent in two inches or stainless steel AISI Type 420, 304 or 316. The 300 Series stainless steel shall be strain-hardened to meet the physical requirements referenced above.
- The "O" Ring stem seal shall be replaceable with the valve under pressure in the full open position. Valves shall open to the left (counter-clockwise) as indicated by a directional arrow cast on a 2" square operating nut.
- All bonnet bolts, seal or gland plate bolts, stuffing box bolts and other bolts with threads exposed to the environment and all exposed nuts shall be manufactured of Type 304 stainless steel.
- Tapping valves shall be furnished with the tapping flange having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange in accordance with MSS-SP60. Tapping valves without the raised face shall not be allowed because they do not insure the proper alignment required to prevent damage caused by a misaligned shell cutter. The interior of the waterway in the valve body shall be a full opening capable of passing a full sized shell cutter equal to the nominal diameter of the valve.

Tapping Sleeves and Valves:

- Cast iron mechanical joint tapping sleeves shall have confined end gaskets to resist cold flow and creep, and be designed for a maximum working pressure of 200 psi. The tapping sleeve shall be shipped with small and large O.D. range gaskets clearly marked and tagged.
- Tapping sleeves shall be cast iron with mechanical joints.
- Tapping valves shall be the Metropolitan New York or Resilient Seated Wedge type with mechanical joint for branch main, and capable of operating at 200 psi.
- Valve opening direction shall be "open-left" (counter-clockwise)

Valve Boxes:

- Each gate valve shall be accompanied by a valve box. Valve boxes shall be heavy pattern ductile iron, and cast in two telescoping sections of sliding construction. Valve boxes shall be coated with coal-tar pitch enamel or other approved coating.
- The upper section of each box shall have a flange at the bottom having sufficient bearing area to prevent settling. The lower section shall be at least 5-1/4 inches inside diameter, belied or domed at bottom to fit over the work. Covers shall be at least 6 inches in diameter, fit flush with the top and shall have the word “WATER" cast thereon in raised letters.
- Valve boxes shall be "Buffalo" type suitable for the size valve on which they are used and shall be as manufactured by Buffalo Pipe and Foundry or approved equal.

Service Box. Service boxes to be provided for new service connections. Service boxes shall be cast iron “Buffalo" type or approved equal. The upper section shall be sliding type with 2-1/2 inch shaft and 24 inches long. The lower section shall have 2-1/2 inch shaft, sliding 40-inches long.

Service Connections. Service connection lines shall be 3/4 or 1 inch Type K Copper as shown on the plans, corporation stop, and service box.

- New service shall include pack joint ball valve curb stop such as Ford of approved equal with 5/8-inch rolled steel rod, 42-inches long.
- Relocated services shall require a pack joint three part coupling such as Ford or approved equal at connection to existing house service.

Air Release Assembly. Air release assembly shall be a corporation stop, copper tubing, and a valve box

Corporation Stop. Corporation stops shall be pack joint fitting such as Ford or Macdonald or approved equal.

Copper Tubing. Copper tubing shall be 1 inch, Type "K", soft temper.

Hydrants. Hydrants shall be “K81-D” as manufactured by the Kennedy Valve and shall meet or exceed the requirements of AWWA Standard C502 (latest revision)

Hydrants shall have a typical bury of 4 .5 feet, but at all times be installed to meet the manufacturer's specification for proper operation of the traffic breakaway feature.

Hydrants shall have two (2), two and one-half inch (2.5") hose nozzles and one (1) four and one-half inch (4.5") pumper nozzle outlet. All outlet nozzle threads are to be National standard.

Hydrant valve openings shall be five and one-quarter inch (5 1/4")

Hydrants shall have a six inch (6") mechanical joint inlet.

Hydrants shall open left (counterclockwise). The operating nut shall be National standard pentagon (1.5" point to flat).

All exterior above ground ferrous surfaces of the hydrants are to be painted yellow by the manufacturer.

The standpipe section shall be connected at the ground line by a designed breakaway coupling device, and the main valve rod sections shall be connected at the ground line by a designed breakaway coupling device of ample strength for normal operating service.

Hydrants must be mechanically and hydrostatically tested as required by AWWA Standard C-502 (latest revision). An affidavit of compliance is to be submitted upon request.

Hose and pumper nozzle caps shall be provided with rubber gaskets and shall be chained to the hydrant barrel.

Pipe Bedding. Material for pipe bedding shall be as specified in Section 701 of the Standard Specifications for Class B Bedding.

Concrete Thrust Blocks and Collars. Concrete for thrust blocks and collars uses shall meet the requirements of Class B as specified in Section 601 of the Standard Specifications.

CONSTRUCTION METHODS:

General Requirements: Water shut-downs shall be coordinated with the owner of the specific system being worked on and shall be performed only as authorized by the Town of Cumberland Water Department at no additional expense to the state. The contractor should assume that **all tie-ins requiring a shutdown of the existing water distribution system will be performed during off peak hours.** No additional compensation shall be granted to the contractor to perform these tie-ins during premium time. All additional costs shall be covered in the unit cost of the items being installed.

Cleaning and Prime Coating Valves and Appurtenances. All surfaces of the valves and appurtenances shall be thoroughly clean, dry and free from all mill-scale, rust, grease, dirt, paint and other foreign substances to the satisfaction of the Engineer.

Notification. Town of Cumberland Water Department shall be notified at least forty-eight (48) hours prior to any item being installed within the system. Pressure testing and/or chlorination shall require a two (2) business day

notification. It is a requirement that a representative of the Town of Cumberland Water Department witness all testing.

Inspection. Town of Cumberland Water Department personnel shall be given full access to the project at all times for inspection or observation of construction of the water main in progress as deemed necessary by Town of Cumberland Water Department. Failure to construct the new extension of the system as per the approval will cause immediate cessation of all construction work.

It is the responsibility of the Contractor to complete the work properly. Any part of the installation found to be noncompliant shall be immediately corrected at the contractor's cost to the satisfaction of Town of Cumberland Water Department and the RIDOT.

The Contractor shall maintain design drawings and record drawings of the progress of the work at the job site and shall be available for Town of Cumberland Water Department inspectors to view at any time. Failure to have these documents available for review or failure to have the documents prepared, may cause cessation of all construction work and disconnection from the Town of Cumberland Water Department system until such time that remedial measures to those requirements have been made.

Handling Pipe and Fittings. The Contractor shall take care during loading, transporting and unloading to prevent injury to the pipe or coating. Under no circumstances shall pipe or fittings be dropped. The Engineer and the Town of Cumberland Water Department shall examine all pipe and fittings before laying, and no piece shall be installed which is found to be defective. The Contractor shall repair any damage to pipe coatings as directed by the Engineer.

If any defective pipe is discovered after it has been laid, the Contractor shall be remove and replace with sound pipe in a satisfactory manner at his own expense. The Contractor shall thoroughly clean all pipe and fittings before laying, shall be kept clean until used in the completed work, and when laid shall conform to the lines and grades shown.

Care shall be taken to prevent damage to valves and appurtenances during handling and installation. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at the Contractor's expense

Laying Pipe and Fittings. The Contractor shall use workmen thoroughly experienced in the installation of pipe, fittings, gate valves, tapping sleeves and valves, flexible couplings, service connections, appurtenances and thrust blocks and provide supervision by qualified personnel furnished by the manufacturer to accomplish the work under these Specifications.

Laying pipe and fittings shall be in accordance with the requirements of AWWA Standard Specifications for Installation of Ductile Iron Water Mains, C600, except as otherwise provided herein. Pipe shall be laid with bell ends facing in the direction of laying, unless directed otherwise by the Engineer.

A firm even bearing throughout the length of the pipe shall be constructed by tamping suitable gravel borrow on all sides of the pipe, including above the pipe. Where ledge is encountered in the bottom of the trench, pipe shall be bedded in a 6-inch minimum layer of suitable backfill or sand. Blocking will not be permitted.

All pipe shall be sound and clean before laying. Good alignment shall be preserved in laying. The deflection at joints shall not exceed manufacturer's recommended deflection. Fittings in addition to those shown on the plans

shall be provided, if required, in crossing utilities which may be encountered upon opening the trench. Solid sleeves shall be used only where approved by the Engineer.

When cutting of pipe is required, the cutting shall be done by saw in a neat and workmanlike manner without damage to the pipe or cement lining. Cut ends shall be smooth and at right angles to the axis of the pipe. Pipe ends to be used with a rubber joint shall be beveled and filed or ground smoothly to conform to the manufactured spigot end. Cement lining shall be undamaged.

At all times when pipe laying is not in progress, including lunchtime or when the trench is unattended, the open ends of pipe shall be closed by watertight plugs or other approved means.

The Contractor shall have on hand at the start of the job, at least four 11-1/4° bends, four 22-1/2° bends, four 45° bends and four 90° bends for the pipe. These shall be used as job conditions require.

All fittings shall be anchored to prevent any movement of the fittings or the adjacent pipe. This anchorage shall be provided by the installation of Portland cement concrete thrust blocks and retainer glands as shown on the Contract Plans and as directed by the Engineer. The Contractor shall verify the extent of anchorages required by the Engineer prior to piping assembly. Hand excavation may be required to excavate for the concrete thrust blocks, the shape and size of which shall be in accordance with the Contract Plans. The Engineer may require concrete to be placed at points on the pipeline other than at fittings. **All concrete used for thrust restraint shall be exposed for at least 16 hours before being covered.**

Jointing Ductile Iron Pipe (Push-On-Type). Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe to be entered shall then be inserted in alignment with the bell of the pipe to which it is to be jointed, and pushed home with a jack or by other means. After jointing the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

Jointing by pushing the pipe home with a backhoe bucket or other heavy equipment will not be permitted. Utilizing the backhoe and a sling to suspend pipe while pushed home by bar or jack is permitted.

Protect the end of the pipe from damage at all times by using a timber header between the end of pipe and the bar or jack.

Jointing Mechanical Joint Valves. Mechanical joints at valves and where designated shall be installed in accordance with the "Notes on Method of Installation" under AWWA C111, AWWA C-600 and the instruction of manufacturer. To assemble the joints in the field, the CONTRACTOR shall thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts. Bolts shall be tightened to the specified torque. Under no conditions shall extension wrenches or pipe over handle of ordinary ratchet torque wrench be used to secure greater leverage.

Pipe couplings shall be installed, where required, for connection to the existing work and as shown on the Contract Plans.

Valves and Boxes. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the gate box. Valves shall be set on a firm foundation and supported by tamping selected excavated material under and at the sides of the valve. The valve box shall be vertically centered over the operating nut and maintain vertical alignment during backfilling operation. Set top flush with finish grade.

After completing the installation, the valve shall be flushed to ensure that the valve seat is clean. Boxes shall be

set vertically and adequately supported squarely over the operating nut.

The entire operation shall be conducted by workmen thoroughly experienced in the installation of restrained and flanged joints and valves.

All old valve boxes to be filled with asphalt, lid removed.

Couplings. After assembly, all exterior surfaces, including bolts and nuts, shall be thoroughly coated with two (2) coats of heavy-duty protective asphaltic coating.

Tapping Sleeves and Valves. Where indicated on the Plans or directed by the Engineer, make installations under pressure using tapping sleeves and valves and maintain the flow of water through the existing mains at all times.

The Contractor shall determine the location of the existing main to be tapped to confirm the fact that the proposed position for the tapping sleeve will be satisfactory and no interference will be encountered. No tap will be made closer than 3 feet from a pipe joint.

Set tapping sleeves, valves and boxes vertically and squarely centered on the main to be tapped. Provide adequate support under the sleeve and valve during the tapping operation. Sleeves shall be no closer than three (3) feet from water main joints. Proper tamping of supporting earth around and under the valve and sleeve is mandatory. After completing the tap, flush the valve to ensure that the valve seat is clean.

The entire operation of installing the tapping sleeve and valve shall be done under line pressure, and conducted by workmen thoroughly experienced in the installation of tapping sleeves and valves and shall be made under the supervision of qualified personnel furnished by the manufacturer.

Service Connections. New service connections shall be installed for all locations where existing service is not Type K copper or red brass as shown on Plans or directed by Engineer.

Existing service connection of Type K copper or red brass shall be relocated as shown on Plans or directed by the Engineer.

New service connections shall include new tap, corporation, copper tubing and new ball valve curb stop.

Relocated service connections shall include new tap, corporation, copper tubing and new adapter-fitting at a location on the existing house service connection designated by the Engineer.

Air Release Assembly. Air release assemblies shall be installed as Directed by the Engineer.

Hydrants. Hydrants shall be set at the location shown or designated by the Engineer and bedded on a firm foundation.

Hydrant shall be set in true vertical alignment and properly braced.

All interior valves, couplings and appurtenances shall be installed true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.

No hydrant shall be backfilled until directed by the Engineer.

Testing. The Contractor shall furnish all necessary equipment and labor for carrying out pressure and leakage tests on the pipeline in accordance with AWWA C-600 Specifications.

The pipe shall be subjected to a hydrostatic pressure of 200 psi and this pressure maintained for at least 2 hours. The following pressure restrictions shall apply:

- Not to be less than 1.25 times the working pressure at the highest point along the test section.
- Not to exceed pipe or thrust restraint design pressures.
- Be of at least 2-hour duration.
- Not vary by more than + 5 psi.
- Not to exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants.
- Not to exceed the rated pressure of the valves if resilient seated butterfly valves are used.

Leakage Test - A leakage test shall be conducted concurrently with the pressure test.

The Contractor shall at his own expense make any taps and furnish all necessary caps, plugs, etc., as required in conjunction with testing a portion of the main between gate valves. He shall also furnish a test pump, gauges, and any other equipment required in conjunction with carrying out the hydrostatic tests. He shall at all times protect the new water mains and the existing water mains against the entrance of pollution material.

Chlorination. Before being placed in service, all new water pipelines shall be chlorinated in accordance with AWWA C-601, “Standard Procedure for Disinfecting Water Mains”. The procedure shall be discussed with the Town of Cumberland Water Department before doing the work for this approval.

The location of the chlorination and sampling points will be determined by the Engineer in the field. The Contractor shall uncover and backfill taps for chlorination and sampling as required.

The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line.

Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced with water from the distribution system. Bacteriological sampling and analysis of the replacement water shall then be made by the Engineer in full accordance with the AWWA Manual C-601. The Contractor shall be required to re-chlorinate, if necessary, and the line shall not be placed in service until the requirements of the State Public Health Department are met.

Special disinfection procedures, such as soaking or swabbing, approved by the Engineer and the Town, shall be used in connections to existing mains, and where the method outlined above is not practical.

The Contractor must dispose of chlorinated water in accordance with State of R. I. Stormwater Regulations.

Disposal of Removed Materials. The Contractor shall be responsible to properly dispose of water pipe and/or appurtenances that are removed.

The Contractor shall cap at all openings water mains, water services, and hydrant runouts that are disconnected from the system and abandoned in place. When pipes are severed at tees, the Contractor shall remove and replace the remaining tee with a section of straight pipe, if possible.

Trench Excavation and Backfill. The Contractor shall install water mains and services with a minimum cover of 4'-6" to the crown of the pipe in an AWWA “Type 5 Trench”. Where unsuitable material is found at or below the grade of the placement of the pipe or fitting, the Contractor shall remove said material shall be removed to the

required width and depth and replace with thoroughly compacted bank run or processed gravel. The Contractor shall deposit material across the full width and length of the trench in layers of not more than twelve (12) inches in depth, before compaction. Each layer shall be compacted to 95% Standard Proctor to a minimum depth of the street subgrade.

The Contractor shall install temporary and permanent pavement over the freshly backfilled trench in an existing street or sidewalk using hot bituminous concrete. Pavement installation shall be installed in accordance with applicable State and Local Municipal standards and requirements.

Thrust Restraint. The preferred method of counteracting thrust is through the use of a mechanical joint restraint device. Concrete thrust blocks are required in conjunction with a mechanical joint restraint device.

Thrust blocks shall be designed using a soil bearing strength of 1,500 pounds per square foot (psf). They shall be constructed in place using Portland cement concrete (R.I. Dept. of Transportation Class "B") having a 28-day compressive strength of at least 3,000 psi, and be located in such a way so as to bear against undisturbed earth. They shall be utilized on all water mains for the following conditions:

- Pipeline direction changes (tees, bends, etc.)
- Dead end lines (caps, plugs or hydrants)
- Transition pieces (reducers, offsets, etc.)

PIPE SIZE (in)	TEES & DEAD ENDS	90 BEND	45 BEND	22 ¼ BEND	11 ½ BEND
4	2,356	3,332	1,803	919	462
6	5,301	7,497	4,058	2,069	1,039
8	9,425	13,329	7,2 13	3,677	1,848
10	14,726	20,826	11 ,271	5,746	2,887
12	21,206	29,989	16,230	8,274	4,157
14	28,863	40,819	22,091	11 ,262	5,658
16	37,699	53,3 15	28,854	14,709	7,390
18	47,713	67,476	36,5 18	18,617	9,353
20	58,905	83,304	45,084	22,984	11 ,547
24	84,823	11 9,958	64,921	33,096	16,628
30	132,536	187,434	10 1,439	5 1,7 13	25,982
36	190,852	269,905	146,072	74,467	37,413
42	259,770	367,371	198,820	10 1,357	50,924
48	339,292	479,831	259,683	132,385	66,5 13
54	429,416	607,287	328,661	167,550	84,180
60	530,144	749,736	405,754	206,852	103,926
66	64 1,474	907,181	490,963	250,291	125,75 1

*Calculated by the Formula T = (2PA SIN(Θ*2)) x 1.25 (except for Tees & Dead Ends where T = PA x 1.25) where ....
T = Thrust, in pounds
P = Water Pressure, in pounds per square inch
A = Area of Pipe, in square inches
Θ = Bend Deflection Angle, in degrees
1.25 Factor of Safety

The sides of thrust blocks shall be formed. Forms shall be removed before backfilling commences. Curing time should be at least forty-eight (48) hours. Minimum bearing shall be that which is depicted on the plans or as directed by Cumberland Water Department. Felt roofing paper shall be used to protect pipe joints. Concrete shall not be placed over bolts or nuts, or placed in such a way that will prevent the removal of joints (NOTE: concrete reaction blocks may be used when bearing against undisturbed soil cannot be achieved).

Vertical fittings shall be anchored to thrust blocks using at least two (2) #5 (5/8-inch minimum), Grade 60, deformed steel rebars. Blocks shall be designed by a professional engineer for pipe sizes greater than 12-inches. Anchors shall be bent to match to outside radius of the fitting to be restrained.

Thrust restraint, where concrete blocks cannot be poured against undisturbed earth, shall be via restrained joint as approved by Cumberland Water Department. This may be accomplished by using a mechanical joint restraining device. Refer to the Ductile Iron Pipe Restraint Guide.

Restrained joint pipe lengths (restrained length), where required, shall be sufficient to counter the thrust imparted by 1 1/2 times the anticipated working pressure, but not less than 150 psi. Calculations for determining the length of pipe restraint shall be based on, the following assumptions: Trench Configuration - A WW A Type 4; Soil Type - Silt 1; Depth of Bury - 4.0' (min); Working Pressure - 150 psi (min); and Factor of Safety - 1.5 (NOTE: computer software such as that produced and distributed by the Ductile Iron Pipe Research Association [DIPRA] may be used [website www.dipra.org]). A printed copy of detailed calculations shall be submitted to Cumberland Water Department for review and approval prior to implementation. Design data shall be displayed on the appropriate plan sheets.

Steel tie rods will be allowed with permission from Cumberland Water Department. If allowed, they shall be of sufficient strength to withstand forces imparted to them. A factor of safety of 2.0 shall be used for all rod thickness calculations. Rods shall be protected from corrosion with at least two (2) coats of asphaltic paint or fusion-bonded epoxy coating.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
PERMANENT 10” WATER MAIN RELOCATION	LS

The price so stated constitutes full and complete compensation for all labor, materials, tools and equipment, including ductile iron pipe, sawcutting, excavation (including trench rock excavation and excavation of unsuitable material below grade), sheeting, shoring, and bracing for excavation and backfill, pipe bedding class B, laying, setting and joining pipe, removal of temporary caps or plugs with or without restraints, provisions of joint restraint, installing pipe on pipe hangers, slides and guides, backfill, temporary pavement patching, steel plating, sterilization of water main, chlorination, sampling, disinfection of water main, leakage and pressure testing and other incidentals necessary to finish the work required, complete and accepted.

CODE 702.9901
STORM WATER TREATMENT DEVICE 1 (4' DIAMETER)

DESCRIPTION: This work consists of furnishing and installing a storm water treatment device (SWTD), complete and operable with the details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. The Contractor shall furnish all labor, equipment and materials necessary to install the SWTD and appurtenances specified in the drawings and these specifications.

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the drawings, the SWTD shall be a Cascade Separator device manufactured by:

Contech Engineered Solutions LLC
9025 Centre Pointe Drive
West Chester, OH 45069
Tel: 1-800-338-1122

Or approved equivalent.

All components shall be subject to inspection by the Engineer at the place of manufacture and/or installation. All components shall be subject to being rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.

The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the RIDOT for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the reference warranty period. The use of SWTD components shall be limited to the application for which they were specifically designed.

The SWTD manufacturer shall submit to the Engineer a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research.

MATERIALS:
Housing units of storm water treatment device shall be constructed of pre-cast or cast-in-place concrete with no exceptions. Precast concrete components shall conform to Part M Section M02 of the RIDOT Standard Specifications, ASTM C 478, ASTM C 857 and ASTM C 858 and the following:

- Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
- Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
- Cement shall be Type III Portland Cement conforming to ASTM C 150;
- Aggregates shall conform to ASTM C 33;
- Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 165, A 185, or A 497.
- Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
- Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.

Internal components and appurtenances shall conform to the following:

- Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
- Support brackets shall be manufactured of 5052 aluminum
- Fiberglass components shall conform to the ASTM D-4097
- Access systems conform to the following:
    - Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to the ASTM A 48 Class 30.

PERFORMANCE

The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. In order to not restrict the RIDOT's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 16 inches in diameter.

The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills and have a capacity listed in Table 1 of the required unit.

The SWTD shall convey the flow from the peak storm event of the drainage network, in accordance with required hydraulic upstream conditions as defined by the Engineer. If a substitute SWTD is proposed, supporting documentation shall be submitted that demonstrates equal or better upstream hydraulic conditions compared to that specified herein. This documentation shall be signed and sealed by a Professional Engineer registered in Rhode Island. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

CONSTRUCTION METHODS: Construction Methods shall conform to the applicable requirements of Part 700; Construction Methods of the Standard Specifications.

The Contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be borne by the Contractor.

The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the Contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours' notice shall be provided to the manufacturer prior to their performance of the services under this subsection.

The SWTD shall be installed in-line with the existing drainage system. Existing reinforced concrete pipes to be intercepted shall be cut, removed, and disposed, incidental to the SWTD items. If any existing pipes are damaged or broken during the installation, additional lengths of pipe shall be installed and replace the existing pipes at the location of the SWTD and shall be paid for under the specified pipe item.

The Contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The Contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.

The Contractor shall remove all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the RIDOT.

TABLE 1: Storm Water Treatment Device Storage Capacities

Cascade Model	Minimum Sump Storage Capacity (yd^3)	Minimum Oil Storage Capacity (gal)
CS-4	0.70	141.0

METHOD OF MEASUREMENT: The item will be measured for payment by the unit "EACH" of such assemblies actually installed in accordance with the plans, this specification, or as directed by the Engineer.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit prices as follows.

Pay Item	Pay Unit
STORM WATER TREATMENT DEVICE 1 (4' DIAMETER)	EACH

The price so stated shall constitute full and complete compensation for all labor, tools, materials and equipment, removal and disposal and backfill items associated with the installation of the device including sawcuts, placing and compacting backfill, steps, ½-in. thick cement mortar coating on both the inside and outside wall surfaces (except for precast structures), removal and disposal of flexible pavement, removal and disposal of curb, removal and disposal of sidewalk, excavation (including trench rock excavation, rock excavation and excavation of unsuitable material below grade), removal and disposal of existing pipe and backfill, all adjustments to grade, which includes all interim adjustments during construction and adjustments to final grade, trimming and fine grading, gravel borrow subbase, full-depth pavement, temporary pavement patching, steel plating, frames and grates (all types), frames and covers (all types), and any curbing adjustments necessary for providing said assemblies, the disposal of all surplus excavated and/or unsuitable material, and for all other incidentals required to finish the work, complete and accepted.

CODE 713.9901
GAS MAIN RELOCATION

DESCRIPTION: This work includes the installation of steel sleeves in each backwall for the gas main to pass through, installation of the gas main and fittings, installation of cathodic protection, pressure testing, and removal and disposal of the gas main in conflict with the proposed improvements in accordance with Rhode Island Energy's specifications.

MATERIALS: Materials are specified in the "Rhode Island Energy RIDOT Bridge Group 17C Replacement of Newell Bridge No. 204 over East Sneech Brook Diamond Hill Rd @ Nate Whipple Highway Cumberland, RI; Main Installation Across Bridge Section 100 Job Description and Design Specifics" as provided in the Contract Specific General Provisions.

Padding Sand: Padding material shall be uniform natural bank sand, graded from all particles sizes smaller than the No. 10 sieve and coarser than a No. 200.

Backfill: Backfill material shall consist of natural bank gravel having durable particles graded from fine (greater than No. 200) to coarse (2-inch) in a reasonably uniform combination with no boulders or stones larger than 2-inch in size.

CONSTRUCTION METHODS: Construction Methods shall conform to the applicable Sections of the Standard Specifications.

Construction Methods are specified in the "Rhode Island Energy RIDOT Bridge Group 17C Replacement of Newell Bridge No. 204 over East Sneech Brook Diamond Hill Rd @ Nate Whipple Highway Cumberland, RI; Main Installation Across Bridge Section 100 Job Description and Design Specifics" as provided in the Contract Specific General Provisions.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
GAS MAIN RELOCATION	LS

The price so stated shall constitute full and complete compensation for all labor, tools, materials and equipment, transporting, loading, and unloading material from the designated RI Energy location, installing the steel sleeves, subcontracting with an RI Energy approved contractor, installing the gas main, valves, fittings, road boxes, rollers, roller supports, insulators, spacers, seals, tracing wire, tape bonding cable, and cathodic protection, pressure testing, removal and disposal of the gas main, including sawcuts, removal and disposal of flexible pavement, removal and disposal of sidewalk, excavation (except rock excavation), trimming and fine grading, padding sand, backfill, adjusting boxes to grade, which includes all interim adjustments during construction and adjustments to final grade, full-depth pavement, As-Builts, the disposal of all surplus excavated and/or unsuitable material, and all incidentals required to finish the work, complete and accepted.

CODE 800.9901
NEWELL BRIDGE NO. 020451

DESCRIPTION: Except for the excluded items of work indicated below, the work under this item shall consist of constructing the Newell Bridge No. 020451 in its entirety. This shall comprise all work pertaining to the construction of:

Superstructure: Included are all the components above the beam seats inclusive of all the bridge bearings in their entirety and all embedded or attached components. Also included is all reinforcing, all closed-cell foam, expanded polystyrene, sealants and all concrete and grout placed between the precast NEXT beams, and other precast superstructure elements including bridge barriers, bridge parapets, and bridge sidewalks, waterproofing membranes, and bituminous concrete pavement from bridge joint to bridge joint. All work to cast reinforced barrier extensions on Rhode Island Standard Drawing 40.2.0 shall be included in this item. All of the above work shall be complete in place and accepted in accordance with the Contract Documents except that the Method of Measurement and the Basis of Payment will be in accordance with these Special Provisions.

Substructure: Included are all components upward from and inclusive of the proposed precast concrete abutments and approach slabs, inclusive of bituminous concrete pavement, all reinforcing , closed-cell foam, sealants, coatings, grout, concrete, CLSM fill within and below precast components, leveling blocks, finishes, stone veneer facing, embedded or attached components, Also included is furnishing and installing the RI Fence 3 chain link fence mount on the existing retaining walls. All of the above work shall be complete in place and accepted in accordance with the Contract Documents except that the Method of Measurement and the Basis of Payment will be in accordance with these Special Provisions.

Excluded Items of Work: The work pertaining to the following items of work are excluded from this lump sum item and instead will be measured and be paid for separately under their own appropriate unit bid or lump sum items as listed in the Proposal: Earthwork and rockwork (structural excavation and various fill materials), stone masonry construction, repointing repairs to the existing abutments and retaining walls, furnishing and installing micropile including testing of micropiles and installation equipment, cast-in-place concrete wall cap, steel reinforcement for the cast-in-place concrete wall cap and drilling and grouting of steel reinforcement at the wall caps.

All work shall be in accordance with the Standard Specifications.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
NEWELL BRIDGE NO. 020451	LS

The price so stated shall constitute full compensation for all labor, materials, tools, equipment, and all incidentals required to finish the work, complete in place and accepted.

CODE 803.9901
REMOVAL AND DISPOSAL OF EXISTING BRIDGE NO. 204 SUPERSTRUCTURE

CODE 803.9902
PARTIAL REMOVAL AND DISPOSAL OF EXISTING BRIDGE NO. 204 SUBSTRUCTURE

DESCRIPTION: Except for the excluded items of work indicated below, the work under these items shall consist of the full removal and disposal of the existing Bridge No. 204 Superstructure, and the partial Removal and Disposal of Existing Bridge No. 204 Substructure. Removal of the existing superstructure work will also include of removing, stockpiling, and delivering existing polyethylene water filled barrier for temporary traffic control to a RIDOT Maintenance facility as shown on the Plans or as directed by the Engineer, all in accordance with this Specification and the applicable sections of the Standard Specifications.

Superstructure:
This item shall consist of the removal and disposal (including saw cuts), in phases, of the existing reinforced concrete slab, bituminous pavement, concrete parapets, sidewalks, bridge curbs, reinforcing steel, steel hardware embedded in concrete, as shown on plans and described in this Special Provision. All work shall be performed in accordance with applicable provisions of the Standard Specifications, except as modified herein and as required by the Engineer.

The removal and salvaging of polyethylene water filled barrier shall conform to the applicable sections of the Standard Specifications with the following additions:

The existing polyethylene water filled barriers shall be removed and stockpiled as needed to complete the work as shown on the Plans or as directed by the Engineer. Care shall be exercised during storing, hoisting and handling of the units to prevent damage. Units showing defects or damage as a result of the Contractor's operations or negligence shall be replaced or repaired by the Contractor at no additional cost to the State.

The Contractor shall contact Matthew Ouellette, State Highway Maintenance Operations Engineer at 401-734-4800 (matthew.ouellette@dot.ri.gov) to coordinate the delivery of the salvaged barrier. No delivery shall be scheduled prior to confirming an acceptable date/time. All salvaged barriers shall be delivered to the RIDOT Maintenance Facility at 395 George Washington Highway Smithfield, RI 02917. The Contractor shall obtain a written receipt(s) for all equipment that has been received at the delivery address and submit such to the Engineer to allow for processing of payment.

Substructure: This item shall consist of the removal and disposal of the curbs, roadway joint materials, concrete abutment stems, wall mounted pipe rail fence (where indicated), all embedded and attached components, as shown on plans, and described in this Special Provision. Note that this includes components that will require asbestos abatement as shown on the contract plans. All work shall be performed in accordance with applicable provisions of the Standard Specifications, except as modified herein and as required by the Engineer.

Excluded Items of Work: The following items of work are excluded from this lump sum item and instead will be measured and be paid for separately under their own appropriate unit bid or lump sum items as listed in the Proposal: Earthwork and rockwork (structural excavation), conduits, conduit wraps and conduit hangars, concrete wingwall caps and removing, stockpiling, trimming, and reinstalling stone masonry on existing retaining walls.

CONSTRUCTION METHODS. Limits and sequence of demolition shall be in accordance with the suggested phase construction scheme provided on the contract plans. All work to be performed in the complete or partial removal of the existing substructures shall be done in such a manner that no debris falls beyond the temporary

protective shield. If any materials do fall beyond the protective shield, the contractor shall remove said materials immediately to the satisfaction of the Engineer.

Contractor shall prepare and submit to the Engineer for review, plans for falsework required for protection of traffic, utilities, and adjacent property.

The use of explosives in any manner whatsoever will not be permitted.

Removal of concrete and stone masonry shall be done in a workmanlike manner to prevent damage to the new, temporary, or existing structure to remain. If any damage to any portion of the new, temporary, or existing structure to remain does ensue due to the Contractor's operations, it shall be repaired or replaced by the Contractor at his sole expense and to the satisfaction of the Engineer.

The Contractor shall submit to the Engineer, in writing, his proposed method of demolition. Demolition operations shall not begin until his method has been approved by the Engineer. This submission shall include the following:

1. The demolition plans, equipment, sequence and methods the Contractor proposes to use, in detail.
2. The location where the Contractor intends to dispose of the demolition debris.

The demolition and falsework submittals must be stamped by a professional engineer registered in the State of Rhode Island. The furnishing of demolition and falsework submittals and plans shall not serve to relieve the Contractor of any part of his/her responsibility for the safety of the work or for the successful completion of the work.

Pavement or Concrete breakers which involve the use of a ball, or punch, dropped or swung mechanically or by gravity or any other method, or use of any equipment which, in the opinion of the Engineer would endanger the stability of the structure to remain or cause a hazard to vehicular or pedestrian traffic, will not be allowed. Concrete or masonry removal along the phase lines shall be performed in a manner such that portions of the structure to remain are in no way damaged and a neat sawcut line meeting the dimensions on the plans is produced.

All removed materials shall be taken from the site to an approved destination as the work progresses. Storing or burying of material/debris on site shall not be permitted.

All work shall be in accordance with the Standard Specifications.

METHOD OF MEASUREMENT: These items will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit prices as follows.

Pay Item	Pay Unit
REMOVAL AND DISPOSAL OF EXISTING BRIDGE NO. 204 SUPERSTRUCTURE	LS
PARTIAL REMOVAL AND DISPOSAL OF EXISTING BRIDGE NO. 204 SUBSTRUCTURE	LS

The price so stated shall constitute full compensation for all labor, materials, tools, equipment, and all incidentals required to finish the work, complete in place and accepted.

CODE 803.9903
ASBESTOS REMOVAL PROCEDURE

DESCRIPTION: The scope of work comprises removal and disposal of materials containing asbestos as indicated in the Asbestos Abatement Plan prepared by RI Analytical and approved by RIDOH (Rhode Island Department of Health) or as directed by the Engineer, and in accordance with these Specifications and Contract Documents. The Contractor shall furnish all labor, equipment and materials necessary to complete the asbestos materials removal work as specified in the drawings and these specifications.

PART l - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
B. The more stringent requirements of this Section, other Sections, the Bid and Contract Documents and Drawings, and the RIDOH approved Asbestos Abatement Plan and other applicable documents and regulations shall apply.

1.2 RELATED WORK UNDER OTHER SECTIONS

A. None.

1.3 DESCRIPTION OF WORK

A. The work includes the complete removal and disposal of materials that contain asbestos including Asbestos Containing Materials (ACM) and as indicated in Part 3 of this Section.

B. The General Contractor shall retain the services of a RIDOH licensed Asbestos Abatement Contractor to perform all required services. The Asbestos Abatement Contractor shall include in his scope of work all required services included in Part 3.

1.4 POTENTIAL ASBESTOS HAZARD & DEBRIS

A. In the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM or materials that contain asbestos. They must take appropriate continuous measures as necessary to protect all other people from the potential hazard of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state, and local agencies.

B. If the Asbestos Abatement Contractor fails to comply with the requirements of the specifications, the Project Monitor may present a written stop of work order. The Asbestos Abatement Contractor must immediately and automatically stop all work until authorized in writing by the Project Monitor to commence work. All costs related to delays shall be at the Asbestos Abatement Contractor's expense.

1.5 DEFINITIONS

Abatement: Procedures to control fiber release from ACM. Includes encapsulation, enclosure, and removal.

Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time.

Asbestos: The name given to a number of naturally occurring hydrated mineral silicates that possess a unique crystalline structure are incombustible and are separable into fibers. Asbestos includes Chrysotile, Crocidolite, Amosite, Anthophyllite, Tremolite, and Actinolite.

ACM: Any material containing greater than 1% by weight of asbestos of any type or mixture of types.

ACWM: Any material containing less than or equal to 1% (≤1%) by weight of asbestos of any type or mixture of types or materials contaminated by asbestos or ACM.

Critical Barrier: A solid, asbestos impermeable partition erected so as to constitute a work area closure; the outer perimeter of an asbestos work area, usually erected across corridors or other open spaces to complete containment.

Designer: RIDOH licensed and EPA accredited Asbestos Abatement Project Designer.

Enclosure: All herein specified procedures necessary to complete enclosure of all ACM behind airtight, impermeable, permanent barriers.

Friable Asbestos Material: Material that contains more than one percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry.

HEPA Filter: A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in length.

Project Monitor: A RIDOH licensed asbestos inspector or licensed asbestos abatement supervisor who has experience and education sufficient to comply with RIDOH asbestos regulations and requirements of OSHA Asbestos in Construction Standard 29CFR1926.1101 as a competent person, who will perform project monitoring and air sampling.

Removal: All herein specified procedures necessary to strip all ACM from the designated areas and to dispose of these materials at an acceptable site.

Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as asbestos contaminated waste.

Work Area: Any area indicated on the Drawings as asbestos abatement areas or as areas containing friable asbestos material.

Worker Decontamination Enclosure Facility (Decon): A decontamination enclosure system for workers, typically consisting of a clean room, a shower room, and an equipment room.

1.6 ASBESTOS ABATEMENT CONTRACTOR USE OF PREMISES

A. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off site.

1.7 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Provide a full time Site Supervisor with all appropriate EPA-accredited training, state licenses, experienced in administration and supervision of asbestos abatement projects including Work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Competent Person as required by 29 CFR 1926.1101 for the Asbestos Abatement Contractor and is the Asbestos Abatement Contractor's representative responsible for compliance with all applicable federal, state, and local regulations. This person must have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures, have had a minimum of two years on the job training and meet any additional requirements set forth in 29 CFR 1926.1101 for a Competent Person, or as otherwise specified in the Asbestos Abatement Plan.

B. Asbestos Abatement Contractor shall provide proof of such certification to the Owner or Owner’s designated representative not less than 10 working days (Document Submission Date) prior to commencing any Work. The accredited Supervisor must be at the Work site at all times.

1.8 SPECIAL REPORTS

A. Except as otherwise indicated, submit special reports directly to the Project Monitor within one day of occurrence requiring special report, with copies to all others affected by the occurrence.

B. When an event of unusual and significant nature occurs at the site (examples: failure of negative pressure system, rupture of temporary enclosures, unauthorized entry into work areas), prepare and submit a special report listing date and time of event, chain of events, response by Contractor's personnel, evaluation of results, and similar pertinent information. When such events are known or predictable in advance, advise the Project Monitor in advance at earliest possible date.

C. Prepare and submit reports of significant accidents, at the site and anywhere else work is in progress related to this project. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss.

1.9 NOTIFICATIONS

A. Secure all permits and provide timely notification as may be required by federal, state, and local authorities including the Health department. Notify the Regional Office of the United States Environmental Protection Agency (USEPA) in accordance with 40 CFR 61.22 (d) (1) and the RIDOH and provide copies of the notification to the Owner or Owner’s designated representative not later than the Document Submission Date.

B. No later than the Document Submission Date, notify the local fire and police department, in writing, of proposed asbestos abatement Work. Advise the fire department of the nature of the asbestos abatement Work, and the necessity that all firefighting personnel who may enter the Work site in the case of fire wear self-contained breathing apparatus. Provide one copy of the notices to the Owner or Owner’s designated representative prior to commencing the project.

C. Submit proof to the Owner or Owner's designated representative that all required permits, site location, and arrangements for transport and disposal of ACM have been obtained.

1.10 PERMIT AND COMPLIANCE

A. The Asbestos Abatement Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.

B. The Asbestos Abatement Contractor shall submit to the Project Monitor the plan for managing the waste including all collection, storage, disposal, and decontamination practices/waste disposal.

C. The Asbestos Abatement Contractor must maintain current certificates of training, licenses, medicals, respirator fit testing for each type of respirator used, or registrations pursuant to OSHA, RIDOH and EPA regulations for all Work related to this Project, including the removal, handling, transport, and disposal of hazardous and industrial waste.

1.11 SAFETY COMPLIANCE

A. Comply with laws, ordinances, rules, and regulations of federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials.

B. Comply with the applicable requirements of the current issues of 29CFR 1926.1101, 40CFR 61, Subparts A and M, 40CFR763 Subpart E, and RI 216-RICR-50-15-1.

1.12 PERSONNEL PROTECTION

A. Prior to commencement of work, workers shall be instructed in and shall be knowledgeable of the hazards of asbestos exposure; use and fitting of respirators; use of showers; entry and exit from work areas, and all aspects of work procedures and protective measures.

B. All abatement workers shall receive training and shall be accredited as required by RI 216-RICR-50-15-1 and 40 CFR 763.90(g). Training and accreditation shall be in accordance with 40 CFR 763, Appendix C to Subpart E. Training shall also be provided to meet the requirements of OSHA Regulations contained in 29 CFR 1926.1101.

C. Prior to the start of work, the Asbestos Abatement Contractor shall provide medical examinations for all employees in accordance with RI 216-RICR-50-15-1 and 29CFR 1926.1101 (m). All employees hired by the Asbestos Abatement Contractor after the start of work shall have medical examinations in accordance with this paragraph before being put to work.

D. Maintain complete and accurate records of employee's medical examinations, during employment and make records of the required medical examinations available for inspection and copying to: The Assistant Secretary of OSHA, the Director of The National Institute for Occupation Safety and Health (NIOSH), authorized representatives of either of them, and an employee's physician upon the request of the employee or former employee.

E. Provide personnel exposed to airborne concentrations of asbestos fibers with disposable protective whole-body clothing, head coverings, gloves, and foot coverings (which shall be fire retardant as required by the nature of the work) . Provide gloves to protect hands. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape. Asbestos Abatement Contractor shall require and monitor the use of complete protective clothing. A competent person designated by the Asbestos Abatement Contractor in accordance with RI 216-RICR-50-15-1, 29CFR1926.1101 and 40CFR763 Subpart E shall periodically examine protective clothing worn by employees in the work area for rips or tears. When rips or tears are detected, they shall be immediately mended or replaced.

F. Provide goggles to personnel engaged in asbestos operations when the use of a full-face respirator is not required.

G. Provide all persons with personally issued and marked respiratory equipment approved by NIOSH and OSHA. The appropriate respiratory protection shall be selected according to the most current RIDOH and OSHA regulations.

H. Where respirators with disposable filters are employed, provide sufficient filters for replacement as required by the worker or applicable regulation.

I. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), Department of Labor, or the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services. All personnel wearing negative pressure respirators shall have respirator fit tests within the last six months and signed statements shall be available.

1.13 CODES AND REGULATIONS

A. Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

B. The Asbestos Abatement Contractor shall assume full responsibility and liability for the compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling, disposal, and protection of Workers, visitors to the site, and persons occupying areas adjacent to the site. The Asbestos Abatement Contractor is responsible for providing medical examinations and maintaining medical records or personnel as required by the applicable federal, state, and local regulations. The Asbestos Abatement Contractor shall hold the Owner and Designer harmless for failure to comply with any applicable Work, hauling, disposal, safety, health, or other regulation on the part of himself, his employees, or his subcontractors.

1.14 REFERENCE STANDARDS

A. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. The requirements of this Section shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified. Where conflict among requirements or with this Section exists, the more stringent requirements shall apply.

B. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials, including 29CFR1926.1101.

C. EPA requirements, which govern asbestos abatement work or hauling and disposal of asbestos waste materials, including 40CFR61 Subparts A and M, and 40CFR763 Subpart E.

D. RIDOH asbestos regulations 216-RICR-50-15-1.

1.15 SUBMITTALS

A. The Asbestos Abatement Contractor must submit one emailed copy of a completed submittal to the Owner or Owner's designated representative no later than the Document Submission Date. No Work can commence until all submittals have been approved. The Asbestos Abatement Contractor will be required to provide updates as needed.

B. Submit all required licenses and certification required under RI 216-RICR-50-15-1, 29CFR1926.1101, 40CFR61 Subparts A and M and 40CFR763 Subpart E, as applicable.

C. Submit a copy of the Asbestos Abatement Contractor written respirator program.

D. Submit manufacturer's certification that vacuums, ventilation equipment, and other equipment required to contain airborne asbestos fibers conform to ANSI Z9.2. Manufacturer's brochures without certifications are not acceptable.

E. Submit for approval the form of security and safety log, which will be maintained on the project.

F. Submit written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the EPA and RIDOH.

G. Submit a detailed plan of the Work procedures to be used in the removal of materials containing asbestos. Such plan shall include location of asbestos control areas, decontamination units, layout of decontamination units, location of access routes to asbestos control areas, interface of trades involved in the construction, sequencing of asbestos related Work, disposal plan, type of wetting agent and asbestos sealer to be used, air monitoring, and a detailed description of the method to be employed in order to control pollution.

H. Submit a plan for emergency actions.

I. Submit the name, address, and telephone number of the testing laboratory selected for the personal air monitoring of airborne concentrations of asbestos fibers to meet Federal and State OSHA regulations, including Short Term Exposure Limit sampling (STEL). The laboratory must have satisfactorily completed the NIST Proficiency Analytical Testing (PAT) Program and be licensed by the appropriate state agency. Submit the certification that persons counting the samples have been judged proficient by successful completion of the NIOSH 582 course (or equivalent) or be listed in the AIHA Asbestos Analysts Registry (AAR). All OSHA required air monitoring should be done in accordance with the most current NIOSH 7400 method.

J. Submit proof that training requirements as specified in 29CFR 1926.1101 (k) (3) and by appropriate state agencies has been complied with.

K. Submit a description of the plans for construction of decontamination enclosure systems and for isolation of the Work areas in compliance with this specification and applicable regulations.

L. Submit a schedule including Work dates, shift time, number of employees, dates of start and completion of all Work, asbestos abatement, inspection and clearance monitoring, each phase of refinishing, and final inspections). Schedule shall be updated with each partial payment request.

M. Submit copies of all notifications.

N. Submit copy of asbestos licenses.

O. Submit Health and Safety Plan per the requirements of OSHA and other applicable regulations.

P. Submit written evidence that the landfill to be used for disposal of asbestos is approved for disposal of asbestos by the RIDOH and EPA.

Q. Submit once work is complete, all disposal waste shipment records and related documents for ACM and ACWM, and a closure report.

1.16 REPORTING

A. Maintain on site a daily log documenting the dates and time of the following items, as well as other significant events:
   1. Minutes of meetings: purpose, attendees, and brief discussion
   2. Visitations: authorized and unauthorized
   3. Personnel: by name, entering and leaving the Work area
   4. Special or unusual events

B. Documentation with confirmation signature of Asbestos Abatement Contractor's Asbestos Supervisor and the Project Monitor of the following:
   1. Inspection of Work area preparation prior to start of removal and daily thereafter.

C. Removal of waste materials from Work area and transport and disposal at approved site.

1.17 AIR MONITORING

The method of removal of the ACM is detailed in the RIDOH-approved Asbestos Abatement Plan and includes utilizing glove-bag removal and/or wrapping with plastic and removal by cutting out sections of plastic wrapped pipe with pipe insulation. ACWM removal in other areas shall comply with the RIDOH-approved Asbestos Abatement Plan.

The Asbestos Abatement Plan includes a waiver for no clearance air sampling for exterior materials removal where no work containment enclosure will be constructed – and the removal method is by glovebag and/or plastic wrap with "candy-stripe" duct tape and glue and glovebag removal at sufficient points along the pipe to safely cut the pipe out in sections – followed by disposal of the pipe with wrap materials as ACM. Similarly, no clearance air sampling will be required for removal of ACWM.

In lieu of clearance air sampling, the asbestos abatement contractor will conduct worker OSHA compliance Excursion Limit and 8-hour TWA PCM air sampling, and RI Analytical (or other licensed asbestos consultant) will conduct upwind and downwind work zone perimeter PCM air sampling during the work [216-RICR-50-15-1 §1.14.8 K.]. The acceptance and stop-work criterion for worker OSHA compliance by PCM NIOSH Merthod 7400 shall be the requirements of OSHA 29CFR1926.1101. The acceptance and stop-work criterion for simultaneous upwind and downwind perimeter air sampling by PCM NIOSH Merthod 7400 shall be that the downwind air sample results shall be equal to or less than the upwind sample result. All air sampling shall be representative of full-shift sampling.

PART 2 - PRODUCTS

2.1 MATERIALS: All materials shall be in accordance with applicable sections of the RIDOT Standard Specifications and as follows:

A. Plastic Sheet: 6-mil minimum thickness, unless otherwise specified, in sizes to minimize the frequency of joints.

B. Tape: Capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under dry and wet conditions, including use of amended water. Provide tape, which minimizes damage to surface, finishes.

C. Cleaning Materials: Use materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

D. Impermeable Containers: Suitable to receive and retain any asbestos containing or contaminated materials until disposal at an approved site. Containers must be both air and watertight.

E. Provide metal or fiber drums with tightly fitting lids and double thickness 6 mil plastic bags capable of being sealed and sized to fit within the drums.

CONSTRUCTION METHODS: Construction Methods shall conform to the applicable requirements of the latest edition of the Rhode Island Standards for Road and Bridge Construction in addition to the provisions of the Asbestos Abatement Plan prepared by RI Analytical and approved by RIDOH.

PART 3 - EXECUTION

3.1 SCOPE OF WORK

It is the Asbestos Abatement Contractor's responsibility to review Owner's contract documents and drawings as well as phasing/schedule of the work. Changing, decreasing, and increasing of phases, size, location, and scope of work shall not constitute compensation by the Owner or any of his representatives.

Refer to the RIDOH-approved Asbestos Abatement Plan for the description of the ACM and ACWM to be abated (removed) and other information.

1. It is the Asbestos Abatement Contractor's responsibility to inspect the site and confirm its condition prior to the submission of his/her bid package. It is also the Asbestos Abatement Contractor's responsibility to review the demolition drawings, notes, and phasing configurations. The Asbestos Abatement Contractor must include in his/her bid the entire scope of the work listed above. Means and methods of removal will be at the discretion of the Asbestos Abatement Contractor with prior review by the onsite Project Monitor and Owner or Owner's designated representative.
2. Perform all required demolition, disconnection and retain the services of electricians and plumbers if needed to perform the work at no additional cost to the owner.
3. Confirm with the owner and plumbers that the pipe to be removed is shut off and disabled before commencement of removal.
4. In all areas where ACM and/or ACWM has to be removed, ACM and ACWM debris is included in the scope of work and has to be removed and disposed of as ACM at no extra cost to the Owner.
5. Remove and dispose as ACM of all ACM insulation including all ACM debris.
6. Remove and dispose as ACM all fiberglass or non-ACM insulation at no additional cost to the Owner.
7. Remove and dispose as ACM of all ACWM including all associated contaminated debris.

3.2 JOB CONDITIONS

A. Do not commence asbestos abatement work until:
   l. Arrangements have been made for the disposal of waste at an acceptable site. Submittal shall be made no later than the Document Submission Date.
   2. Pre-clean all areas prior to performing the work.

B. All materials resulting from abatement work, except as specified otherwise shall become the property of the Asbestos Abatement Contractor and shall be disposed of as specified herein.

3.3 INSPECTION AND PREPARATION

A. Examine the areas and conditions under which asbestos will be abated and notify the Project Monitor in writing of conditions detrimental to the proper and timely completion of the work.

B. Before any work commences, post danger signs in and around the Work Area to comply with 29CFR 1926.1101 (k) (l) as required by federal and state regulations, and as specified herein.

3.4 WORK PROCEDURE

A. Perform asbestos related work in accordance with all applicable regulations and as specified herein. Use glovebag and intact removal procedures as described in the Asbestos Abatement Plan. Personnel shall wear and utilize protective clothing and equipment as specified herein. Personnel of other trades not engaged in the removal and demolition of asbestos must not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection provisions of this specification are complied with by the trade personnel.

B. Each worker and authorized visitor shall, upon entering the job site, shall put on a respirator and clean protective clothing before entering the work area. All workers shall remove gross contamination before leaving the work area. All clothing (coveralls, head covers, boots, etc.) shall be removed and properly disposed of before leaving the work area. Respirators shall be removed and cleaned. Cleaned respirators shall be placed in suitable clean plastic bags. The Asbestos Abatement Contractor's designated competent person shall ensure that these practices are being adhered to.

C. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos containing or asbestos contaminated materials and until final cleanup is completed. This includes the removal of any equipment in contact with ACM such as saws, hand tools, etc.

3.5 PREPARATION OF THE WORK AREA

A. Scaffolding must be constructed in compliance with industry safety standards and inspected by a licensed and certified person(s). Scaffolding should be constructed in a way that allows asbestos abatement workers to fully access all sides including top and bottom of the water pipe. Double layered 6-mil poly sheeting must be installed across the floor with application of non-slip tape. Double layered 4-mil poly sheeting must be installed and supported against wind up to the height of the pipe on all sides of scaffolding platform with side-railings and secured with durable tape and glue.

B. Install a 3-stage Decon facility adjacent to the work area.

C. Prior to any asbestos abatement work, clean the work area using HEPA filtered vacuum equipment and wet cleaning methods as appropriate. Methods that raise dust, such as dry seeping or vacuuming with equipment not equipped with HEPA filters will not be permitted. Dispose of all cloths which are used for cleaning as contaminated waste.

D. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment per applicable electrical code requirements. Provide 24-volt safety lighting and provide ground-fault interrupter circuits as power source for lights and electrical equipment.

E. Prior to any abatement activities seal all scaffolding floor and railing openings or penetrations that have not already been sealed. This includes penetrations through the floor, both empty holes and holes accommodating items such as cables, pipes, ducts, conduit, etc.

F. Maintain emergency and fire exits from the work areas or establish alternative exits satisfactory to the local fire officials. Coordinate work with local fire and police departments, and Project Monitor.

G. ***Confirm with Owner or Owner's designated representative that water flow through the pipe from the ACM is to be removed by wrapping and cutting the pipe is completely shut off and all respective valves are closed.***

H. Wrap the pipe with two layers of 6-mil poly sheeting and seal with glue and duct tape in a candy striping pattern across all wrapped areas.

I. Install glovebags at each section of pipe where there is a suspended metal hanger with ACM black sealer. Remove the pipe insulation at each hanger inside the glovebag, and out to at least 1 LF on each side of the hanger.

J. After completion of glovebag removal to expose clean metal pipe, cut the pipe while it is adequately supported and lower the 6-mil plastic wrapped with candy-stripe duct tape wrap to the scaffold containment floor. Review work procedures for cutting the pipe section with Owner so that all parties are in agreement on the methods to be implemented for safe removal of the wrapped pipe.

K. Cut the hangers below the surface of the underside of the bridge and dispose of them as ACM as the hangers have ACM black sealer at the pipe end of the hangers.

L. Glovebag removal method may be used instead of removal using wrap/candy stripe/glovebag procedures indicated above in §3.5 H, I, J and K, leaving pipe and hangers free of asbestos for other contractors to remove.

M. The Asbestos Abatement Contractor shall conduct worker breathing zone OSHA 29CFR1926.1101 compliance air sampling during pipe wrap, glovebag and pipe cutting and load-out work. The Owner's Project Monitor will conduct upwind and downwind air sampling during the work. All air sampling shall be completed in accordance with NIOSH method 7400 (most recent version). All air sample results shall be delivered by email to the Owner or Owners' designated representative within 24-hours (i.e., by the end of the next business day after sample collection). The results of this air sampling shall also be forwarded to the RIDOH, asbestos program at Email **DOH.Asbestos@health.ri.gov**. Refer to §1.17 AIR MONITORING, above.

3.6 MAINTENANCE OF ENCLOSURE SYSTEMS

A. Ensure that barriers and plastic walls and floor on scaffolding are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning of each work period.

3.7 CONTROL ACCESS

A. Permit access to the work area and scaffolding only through the designated entrance and exit. All other means of access shall be closed off, warning signs displayed on the clean side of the sealed access.

3.8 DECONTAMINATION OF WORK AREA

A. Maintain premises and public properties free from accumulation of waste, debris, and rubbish, caused by operations. Remove visible accumulations of asbestos material and debris. Wet clean all surfaces within the work area.

B. Remove all debris from the floor of the work area. This includes all trash, scraps of lumber, pipes, etc. and all visible asbestos debris. The asbestos debris is primarily deteriorated pipe insulation that has fallen to the ground. Dispose of all debris removed as asbestos contaminated waste. HEPA vacuum the entire floor.

D. Clean all surfaces in the work area and any other contaminated areas with water and with HEPA filtered vacuum equipment. Perform a complete visual inspection of the work area to ensure that the work area is free of visible asbestos debris.

E. Include sealed drums and all equipment used in the work area in the cleanup and remove from work areas at an appropriate time in the clean sequence.

F. Conduct cleaning and disposal operations to comply with applicable ordinances and antipollution laws. Do not burn or bury rubbish and waste materials on job site. Do not dispose of volatile wastes in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

G. Store volatile wastes in covered metal containers during work hours and remove it from premises at the end of the workday. Prevent accumulation of wastes, which create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.

H. If the Project Monitor finds visible accumulations of debris in the work area, repeat the wet cleaning until the work area is in compliance, at no additional expense to the Owner.

I. Following the final visual inspection by the Asbestos Project Monitor, after the removal of ACM, ACWM and debris and decontamination of work areas, seal all surfaces from which asbestos-materials have been removed and the work area surfaces to assure immobilization of any remaining fibers by using a colored sealant (if requested by Project Monitor at no additional cost by the Asbestos Abatement Contractor) so that complete coverage may be ensured by a visible inspection by the Asbestos Project Monitor to verify that asbestos-materials has been adequately removed. Apply lock-down encapsulant sealer in accordance with manufacturer's recommendations using only airless spray equipment.

J. Clean and decontaminate all access routes used to transport asbestos waste.

3.13 WORK AREA CLEARANCE

A. The Asbestos Abatement Contractor will notify the Project Monitor when the asbestos abatement work has been completed and the work area is ready for visual inspection.

B. The Asbestos Project Monitor will conduct a visual inspection of all work areas and confirm with the Asbestos Abatement Contractor that the area is satisfactorily clean (i.e., meets the regulatory standard of “no visible debris”, regardless of whether or not asbestos is present).

3.14 DISPOSAL OF ACM AND ASBESTOS CONTAMINATED WASTE

A. At the end of each work day remove sealed and labeled containers of asbestos waste to an authorized temporary storage location as approved in advance by Owner or Owner’s designated representative.

B. Comply with 29CFR 1926.1101, 40CFR 61, Subparts A and M, 40CFR763 Subpart E, and RI 216-RICR-50-15-1.

C. Seal all asbestos and asbestos contaminated waste material with double thickness 6-mil, sealable plastic bags. Label the bags; transport and dispose of all in accordance with the applicable OSHA and EPA regulations. At the conclusion of the job, place all polyethylene material, tape, cleaning material and clothing in the plastic lined drum. Seal, correctly label, and dispose of asbestos waste material.

D. Transport the bags to the approved waste disposal site. Asbestos Abatement Contractor shall obtain trip tickets at the landfill to document disposal of asbestos containing materials. A form shall be signed, not initialed, by all parties. Copies of all trip tickets and waste manifests shall be submitted to the Project Monitor.

E. If a rental vehicle is used to transport asbestos waste, Asbestos Abatement Contractor shall provide to the vehicle's owner a written statement as to the intended use of the vehicle. A copy of such notice, signed by the vehicle owner, shall be provided to the Project Monitor prior to transporting materials in the vehicle. Two layers of 6-mil plastic sheet shall be placed on the floor, walls and ceiling of the rental vehicle prior to loading any containers of asbestos waste.

F. Waste water from showers and operations must be treated as contaminated waste and disposed of in accordance with this Section.

3.15 DISPOSAL OF NON-CONTAMINATED WASTE

A. Remove from the site all non-contaminated debris and rubbish resulting from work operations. Transport these materials and dispose of them offsite in a legal manner.

B. During progress of work, clean site, and public properties, and dispose of waste materials, debris, and rubbish. Provide on-site containers for collection of non-asbestos and non-hazardous waste materials, debris, and rubbish. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.

3.16 FINAL CLEAN UP

A. Employ experienced workers or professional cleaners for final cleaning. Remove grease, dust, dirt, stains, labels, tape and other foreign materials. Clean surfaces as indicated by the Owner or Owner’s designated representative.

3.17 PREPARATION OF A NEW ASBESTOS ABATEMENT PLAN IF THE RIDOH-APPROVED ASBESTOS ABATEMENT PLAN INCLUDED IN THE CONTRACT DOCUMENTS EXPIRES.

A. It is understood that the contractor may not be able to commence asbestos abatement work within 6 months of the RIDOH Asbestos Abatement Plan approval date. The contractor is responsible for filing an application to re-activate the Asbestos Abatement Plan so that work can start after 6 months but prior to 12 months of the RIDOH Asbestos Abatement Plan approval date. The RIDOH fee for this plan re-activation is waived for RIDOT as a State Agency. Submit the application to Owner for review and approval prior to submitting it to RIDOH. EPA and RIDOH start work notification forms must be amended as needed. The contractor fee to prepare this re-activation application is included under Item Code 803.9901 Remove and Dispose Existing Bridge No. 204 and Item Code 803.9902 Partial Removal and Disposal of Existing Bridge No. 204 Substructure.

B. It is understood that the contractor may not be able to complete the asbestos abatement work within 12 months of the RIDOH Asbestos Abatement Plan approval date. If the asbestos abatement work has not been completed within 12 months of the RIDOH Asbestos Abatement Plan approval date, the contractor shall engage the services of an EPA-accredited and RIDOH-licensed Asbestos Project Designer who is acceptable to the Owner, to prepare a new Asbestos Abatement Plan for ACM and asbestos materials not removed within the 12 months. The RIDOH fee for this new plan is waived for RIDOT as a State Agency. Submit the application to Owner for review, approval and notarized signature prior to submitting it to RIDOH. EPA and RIDOH start work notification forms must be submitted as needed. The contractor fee to prepare this re-activation application is included under Item Code 803.9901 Remove and Dispose Existing Bridge No. 204 and Item Code 803.9902 Partial Removal and Disposal of Existing Bridge No. 204 Substructure.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: This item will be paid for under the lump sum price for Item Code 803.9901 Removal and Disposal of Existing Bridge No. 204 Superstructure and 803.9902 Partial Removal and Disposal of Existing Bridge No. 204 Substructure.

841
PRE- AND POST-CONSTRUCTION CONDITION SURVEYS

All work shall conform to Section 841 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024, with the following additions:

Pre- and post-construction surveys shall be performed for the following and structures:

1. Existing stone masonry retaining walls that remain.

2. Existing stone masonry abutments that remain.

Condition surveys are only required for the buildings and structures listed above and do not need to be conducted for other structures within 200 feet of construction activities unless directed by the Engineer.

CODE 841.9901
WATER LINE PRE AND POST CONSTRUCTION CONDITION SURVEYS

DESCRIPTION: The work includes labor, equipment, and materials necessary to conduct pre- and post-construction condition surveys of the water line within the project limits.

SUBMITTALS: The Contractor shall submit to the Engineer for approval the following:

- For both the pre- and post-construction condition surveys, submit an original report and copies with all documentation to the Engineer for review. Ensure that each report contains a DVD or CD with a complete electronic version of the report in PDF format and all video and still photography taken during the survey.
- Provide the pre-construction surveys to the Engineer a minimum of two weeks before starting work.
- Retain one copy of all results of the pre- and post-construction surveys in a suitable location on site. Ensure the availability of the documents for viewing during normal working hours. Do not produce any duplicates, other than as specified above, of any survey information without the written consent of the Engineer and the property owner.

CONSTRUCTION METHODS: The Contractor shall include the pre and post construction condition surveys in the Project Schedule.

The Contractor shall conduct the pre-construction survey before initiating construction operations and vibration inducing activities. This includes driving and removal of piles and sheeting, drilling, boring, blasting, structural demolition, and any other vibration-inducing activity resulting from the operations. The Contractor shall not initiate any work that may result in damage to the water line until the preconstruction survey report has been submitted and approved by the Engineer.

The Contractor shall perform non-destructive testing to assess the condition of the water line including leaks.

The Contractor shall document the survey through a written report that includes visual imaging, photographs, video, and sketches,

The Contractor report shall emphasize the following:
- Locations and sizes of damage, cracks and leaks in the water line
- For post-construction survey, changes from the pre-construction survey

The Contractor shall perform a post-construction survey upon substantial completion of the Contract with the consent of the Engineer, and follow the same procedures and protocols used for preconstruction survey.

The Contractor shall repair damage sustained to the water line due to construction operations to the satisfaction of the Engineer at no additional cost to the Department or property owner.

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
WATER LINE PRE AND POST CONSTRUCTION CONDITION SURVEYS	LS

The price so stated shall constitute full compensation for all labor, materials, equipment, and all incidentals required to finish the work, complete and accepted.

CODE 841.9902
VIBRATION MONITORING

DESCRIPTION: This work includes all labor equipment and materials necessary to conduct real-time vibration monitoring during demolition work, drilling and driving and all other construction activities that produce vibrations adjacent to sensitive utilities (i.e. gas mains) within 200 feet of the work in accordance with the Standard Specifications and as directed by the Engineer.

CONSTRUCTION METHODS: The real-time vibration monitoring system shall be capable of providing real time alerts to RIDOT, the engineer and the contractor when vibrations exceed established thresholds as determined by the Engineer. Ensure that that vibration monitoring work conforms to Subsection 804.03.11(a).

METHOD OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
VIBRATION MONITORING	LS

The price so stated shall constitute full compensation for all labor, materials, tools, equipment, and all incidentals required to finish the work, complete in place and accepted.

CODE 901.9901
STEEL BEAM GUARDRAIL TRANSITION TO RIGID BARRIER

DESCRIPTION: Work under this item shall consist of furnishing and installing the Steel Beam Guardrail Transition to Rigid Barrier at the locations designated on the plans or as directed by the Engineer and that comply with the currently adopted edition of the AASHTO Manual for Assessing Safety Hardware (MASH). The steel beam guardrail transition to rigid barrier shall comply with Section 901 of the latest RIDOT Standard Specification for Road and Bridge Construction and the RIDOT Standard Details.

MATERIALS: The steel beam guardrail transition to rigid barrier shall conform to Subsections M08.03 and M08.08 of the Standard Specifications.

CONSTRUCTION METHODS: The steel beam guardrail transition to rigid barrier shall be installed in accordance with the specifications and recommendations of the manufacturer and conform to Section 901.03 of the Standard Specifications.

METHOD OF MEASUREMENT: The item will be measured for payment by the unit "EACH" unit actually furnished, fabricated, and installed in accordance with the Plans, this specification, or as directed by the Engineer.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit prices as follows.

Pay Item	Pay Unit
STEEL BEAM GUARDRAIL TRANSITION TO RIGID BARRIER	EACH

The price constitutes full and complete compensation for all labor, tools, materials, equipment, and all incidentals required to finish the work, complete and accepted.

CODE 919.9901
TEST PITS AND MATERIAL TESTING

DESCRIPTION: This work includes excavating exploratory test pits in the areas of anticipated excavation, sampling the soil from these excavations, testing the soils for contamination, and classifying the soils.

MATERIALS: Materials associated with test pit excavations such as backfill, subbase, and base courses, asphalt pavements, and loam and seeding are specified in PARTS 200, 300, 400, and L of the Standard Specifications.

CONSTRUCTION METHODS: The Contractor shall identify areas of excavation and estimate the volume of soil from the excavated area. The Contractor shall perform a test pit at these areas of excavation. The Contractor shall collect representative soil samples to determine if oils and/or hazardous materials (OHM) may be present in exceedance of the Rhode Island Department of Environmental Management (RIDEM) Method 1 Criteria. For example, if the Contractor anticipates excavating 8 feet deep, then the Contractor shall sample the soil at the 4 foot mark of the test pit.

For excavation areas greater than 500 cubic yards, the Contractor shall perform a test pit for every 500 cubic yards. For example, if the Contractor anticipates excavating 2200 cubic yards, then the Contractor shall perform 5 test pits.

Test pit excavations may include any or all of the following items, the construction methods for which are specified in PARTS 200 and L of the Standard Specifications:

- Cutting pavement
- Breaking up and disposal of existing pavements
- Test pit excavation
- Backfill and compaction, where required
- Loam and seeding
- Replacement paving to match as nearly as possible the existing pavement in thickness

The Contractor shall submit the samples to an RI-accredited laboratory for a full suite of analysis, including volatile organic compounds, semivolatile organic compounds, total metals (i.e., priority pollutant 13 metals), total petroleum hydrocarbons and polychlorinated biphenyls.

Following the results of the testing, the Contractor shall classify the soils of each anticipated area of excavation in accordance with Section 202.02.3 Contaminated Soils of the Standard Specifications.

The Contractor shall identify the location of each test pits, and document, sample, and test the soil from each test pit. The Contractor shall submit the results of the test pits to the Department according to TAC-0434 Geotechnical/Environmental Subsurface Exploration Logs and GeoInfo Database.

METHOD OF MEASUREMENT: This item will be measured for payment by the units of “EACH” test pit actually performed in accordance with the plans, this specification, or as directed by the Engineer.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
TEST PITS AND MATERIAL TESTING	EACH

The price constitutes full compensation for labor, materials, and equipment, including cutting and matching pavement, removal and proper disposal of existing pavements, excavation, pumping and bailing, backfilling, loaming and seeding, where required, sampling, testing, classification, documentation and electronic submission of the results, and all incidentals required to finish the work, complete and accepted.

The replacement of subbase and base courses, and the replacement paving and resurfacing, will be paid for separately under the appropriate work items.

929
FIELD OFFICES

Add the following to Section 929.03.5b Equipment from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024:

929.03.5b Equipment.

One (1) Standard Air Meter
Gilson (http://www.globalgilson.com/)
Gilson Type B Pressure Meter
HM-30

938.1000
PRICE ADJUSTMENTS

Description.

a) **Liquid Asphalt Cement.** The Base Price of Liquid Asphalt Cement as required to implement **Subsection 938.03.1** of the Standard Specifications is $ 590.00 per ton.

b) **Diesel Fuel.** The Base Price of Diesel Fuel as required to implement **Subsection 938.03.2** of the Standard Specifications is $ 2.6036 per gallon.

c) **Steel.** The Base Price of Steel as required to implement **Subsection 938.03.3** of the Standard Specifications. The following page provides the base prices for structural steel and rebar for this Contract.

11-08-2023

May 2023 Structural Steel & Rebar Base Prices for Contracts

Note 1: This list goes into effect May 1, 2023 and will remain in effect until revised.
Note 2: This list supersedes and replaces any earlier list.
Note 3: This list is based on the May 1, 2023 Worksheet.
Note 4: This list uses the BLS period price index of 461.285 for semi finished Steel Mill products (series ID# WPU101702)

ITEM NO.	DESCRIPTION		May 2023 PRICE PER POUND		May 2023 PRICE PER KILOGRAM
1	ASTM A615/A615M Grade 60 (AASHTO M31 Grade 420) Reinforcing Steel	$	0.67	$	1.47
2	ASTM A27 (AASHTO M103) Steel Castings, H-Pile Points & Pipe Pile Shoes (See Note (1) below.)	$	0.90	$	1.99
3	ASTM A668 / A668M (AASHTO M102) Steel Forgings	$	0.90	$	1.99
4	ASTM A108 (AASHTO M169) Steel Forgings for Shear Studs	$	1.01	$	2.23
5	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 250 Structural Steel Plate	$	1.10	$	2.42
6	ASTM A709/A709M Grade 36 / AASHTO M270M/M270 Grade 250 Structural Steel Shapes	$	0.78	$	1.72
7	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 345 Structural Steel Plate	$	0.96	$	2.12
8	ASTM A709/A709M Grade 50 / AASHTO M270M/M270 Grade 345 Structural Steel Shapes	$	0.78	$	1.72
9	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 345WT Structural Steel Plate	$	1.14	$	2.51
10	ASTM A709/A709M Grade 50WT / AASHTO M270M/M270 Grade 345WT Structural Steel Shapes	$	0.86	$	1.91
11	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 345W Structural Steel Plate	$	1.03	$	2.28
12	ASTM A709/A709M Grade 50W / AASHTO M270M/M270 Grade 345W Structural Steel Shapes	$	0.80	$	1.77
13	ASTM A709/A709M Grade HPS 50W / AASHTO M270M/M270 Grade HPS 345W Structural Steel Plate	$	1.16	$	2.56
14	ASTM A709/A709M Grade HPS 70W / AASHTO M270M/M270 Grade HPS 485W Structural Steel Plate	$	1.23	$	2.71
15	ASTM A514/A514M-05 Grade HPS 100W / AASHTO M270M/M270 Grade HPS 690W Structural Steel Plate	$	1.87	$	4.13
16	ASTM A276 Type 316 Stainless Steel	$	5.57	$	12.27
17	ASTM A240 Type 316 Stainless Steel	$	5.57	$	12.27
18	ASTM A148 Grade 80/50 Steel Castings (See Note (1) below.)	$	1.93	$	4.25
19	AASHTO M270M/M270 Grade 345W Structural Steel Plate - same as Item #11.		**Same as Item #11.**		
20	AASHTO M270M/M270 Grade HPS 345W Structural Steel Plate - same as Item #13.		**Same as Item #13.**		
21	AASHTO M270M/M270 Grade 250 Structural Steel Plate - same as Item #5.		**Same as Item #5.**		
22	ASTM A53 Grade B Structural Steel Pipe	$	1.24	$	2.73
23	ASTM A500 Grades A, B, 36 & 50 Structural Steel Pipe	$	1.24	$	2.73
24	ASTM A252, Grades 240 (36 KSI) & 414 (60 KSI) Pipe Pile	$	0.96	$	2.11
25	ASTM 252, Grade 2 Permanent Steel Casing	$	0.96	$	2.11
26	ASTM A36 (AASHTO M183) H-piles, steel supports and sign supports	$	0.83	$	1.83
27	ASTM A328 / A328M, Grade 50 (AASHTO M202) Steel Sheetpiling	$	1.83	$	4.04
28	ASTM A572 / A572M, Grade 50 Sheetpiling	$	1.82	$	4.02
29	ASTM A36/36M, Grade 50	$	1.07	$	2.37
30	ASTM A570, Grade 50	$	1.07	$	2.35
31	ASTM A572 (AASHTO M223), Grade 50 H-Piles	$	0.79	$	1.73
32	ASTM A1085 Grade A (50 KSI) Steel Hollow Structural Sections (HSS), heat-treated per ASTM A1085 Supplement S1	$	1.25	$	2.75

NOTES:

(1) *Steel Castings* are generally used only on moveable bridges. Cast iron frames, grates and pipe are not “steel” castings and will not be considered for price adjustments.

SECTION 941
E-TICKETING

Remove Section 941 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024 in its entirety and replace with:

941.01 DESCRIPTION.

This work shall consist of providing electronic material tickets for all loads of HMA or ready mixed PCC delivered to the project. Electronic tickets for other materials supplied to a project may be submitted at the Contractor's and the Engineer's mutual agreement.

941.02 EQUIPMENT.

The Department's e-Ticketing program is web-based system, the supplier will be required to establish a live connection to the Department's ticket database.

941.03 METHODS.

Conduct a test of each supplier's integration with the Department's e-Ticketing Portal prior to shipping material. Complete test at least 14 days prior to shipping material unless otherwise approved by the engineer. The test must involve at least four calibration e-Tickets from each supplier approved for use on the project. After the engineer confirms the calibration eTickets have been entered into the Department's e-Ticket Portal, void the e-Tickets with the reason "Calibration Testing".

Uptime reliability of the material supplier's ticketing system must be 99.5% over any 30-day rolling period. Uptime is defined as the ability for the Department to receive electronic tickets within a maximum of 10 minutes from when the ticket was created.

Ensure the identifying vehicle numbers on the delivery vehicle correspond to the ticket. Place the numbers on the delivery vehicles such that at least one can be safely read from within the work area. Delivery vehicles without identifying vehicle numbers shall be rejected.

Each material ticket shall contain the following in Department approved format:

- General Ticket information (All Material).
    - Date
    - RIDOT Project Number
    - RIDOT Project Name
    - Name of Prime Contractor
    - Name of material supplier
    - Unique truck ID
    - Ticket Number
    - Plant/scale name (source)
    - Truck Status Times:
        + Loaded time (time batched) shall be available
        + Provided other truck status times as available

        - Ticketed
        - Load time
        - Left plant
        - Arrive at project
        - Begin unload
        - Finish unload
        - Leave project
- Portland Cement Concrete.
    - Loaded time (water/cement time).
    - Wet and dry batch weights (if computer generated).
    - Water:
        + In aggregate
        + Total water
        + Water/cement ratio
        + Max water/cement ratio
        + Allowable water to add
    - Admixtures (including brand names if available):
        + Retarder and weights
        + Water reducer and weights
        + Air entrainment and weights
        + Special performance admixtures and weights
        + Concrete fibers
    - Cementitious material(s) and weights
    - CPI Name and certificate number
- Hot Mix Asphalt.
    - Mix design Number.
    - Class of Mix.
    - Modified of Unmodified
    - Gross weight.
    - Tare weight.
    - Net weight.
    - Cumulative tonnage for that paving session.

941.04 METHOD OF MEASUREMENT.

The Department will not measure electronic ticketing.

941.05 BASIS OF PAYMENT.

The cost associated with creating and maintaining an API, providing electronic ticketing data, and placing identifying vehicle numbers on the delivery vehicles is incidental to the item being placed.

The Department may reject any load that does not have a corresponding eTicket unless the cause is beyond the contractor's control. In such circumstances paper tickets may be permitted at the discretion of the Engineer. If e-Tickets cease to be issued, paving operations will be shut down upon the conclusion of an ongoing session. In such circumstances paper tickets will be permitted until the end of the paving session or placement. If, in the judgement of the Engineer, the Contractor fails to issue electronic tickets in accordance with the specification, the appropriate charges in the Table of Fines in **SECTION 110** will be deducted from monies due to the Contractor.

CODE 999.9901
FURNISH AND INSTALL INTERPRETIVE SIGN AND FOUNDATION

DESCRIPTION: This work consists of furnishing and installing the interpretive sign and foundation to the lines and grades indicated on the Plans or as directed by the Engineer.

MATERIALS: Materials shall conform to the requirements shown on the plans, the Standard Specifications and manufacturer specifications.

The product shall be a 36x24 Cantilevered Sign as designed by Pannier Graphics, 345 Oak Road, Gibsonia, PA 15044, or approved equal.

Interpretive Sign:
Frame Size: 36.5”w x 24.5”h
Frame Material: Powder Coated Aluminum
Trim Size: 35.875”w x 23.875”h
Visual Area: 35”w x 23”h
Frame Color: Black or Brown (NPS Standard)
Finish: Satin

Foundation:
The Contractor shall provide a concrete foundation in accordance with the plans and conforms to the 2013 AASHTO “Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, Sixth Edition” (and interim specifications) and the Standard Specifications.

Sign, foundations, connections, anchor bolts, and all other members shall be designed and fabricated in accordance with the requirements and specifications of the manufacturer and the Standard Specifications.

CONSTRUCTION METHODS: This item shall be installed as shown on the Plans and per manufacturer specifications and instructions.

Interpretive Sign Graphic:
Contractor shall coordinate with RIDOT upon Contract Award. RIDOT will provide the Contractor with the graphic panel and the Contractor shall install the graphic panel on the installed sign, per manufacturer specifications and instructions.

Foundation:
The Contractor shall have the foundation for the Interpretive Sign engineered and submitted to the RIDOT for approval. The foundation shall be at least as deep as 6” below the local frost line.

The Contractor shall determine which method they will use for attachment of the sign to the foundation (direct embedment, base plate attachment, etc.).

METHODS OF MEASUREMENT: This item will not be measured for payment.

BASIS OF PAYMENT: The Department will pay for the completed and accepted quantities at the Contract unit price as follows.

Pay Item	Pay Unit
FURNISH AND INSTALL INTERPRETIVE SIGN AND FOUNDATION	LS

The price constitutes full and complete compensation for all labor, engineering, materials, tools, equipment, installing the interpretive sign and foundation, engineering and approval of the foundation, excavation, (except rock excavation), the disposal of all surplus excavated and/or unsuitable material, backfill, gravel borrow, storage and handling, installation of graphic panel from RIDOT, and all incidentals required to finish the work, complete and accepted.

SECTION L01
LOAM, PLANTABLE SOIL, OR HIGH ORGANIC SOIL

Remove Section L01 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2024 in its entirety and replace with:

L01.01 DESCRIPTION.

L01.01.1 Loam.

This work includes placing loam to the required lines, grades, limits, and depths.

L01.01.2 Plantable Soil.

This work includes furnishing and placing plantable soil to a 4-in. depth on designated areas.

L01.01.3 High Organic Soil.

This work includes furnishing and placing high organic soil to the lines, grades, and depths in detention ponds, wetland replacement, and/or wetlands restoration/reclamation areas.

L01.02 MATERIALS.

Provide loam, plantable soil, and high organic soil that is clean and free of any undesirable material and conforms to **SECTION M18.**

L01.03 CONSTRUCTION METHODS.

Place all materials on surfaces that are true to the required lines, grades, and cross sections. Place and spread the materials to the required depth and minimum thickness.

L01.03.1 Loam.

Provide the loam from sources outside the Project limits. Submit a sample for testing before the placement of loam. The Engineer will approve the sample before placement. Loam that does not meet the requirements in **SECTION M18** will be rejected.

Before placement, prepare the surface to receive the loam. Remove and dispose of all roots, sod, weeds, cobbles, or stone with any dimension greater than 1 in.

Grade the loamed surface and, in addition to the removal and disposal before placement, remove and dispose of all roots, sods, weeds, cobbles, or stones with any dimension greater than 1 in. After shaping and grading, do not allow any trucks or other equipment that is not required to perform seeding, mulching, or mowing operations on the loamed areas.

Perform this work only with permission from the Engineer. The Engineer may suspend work when it is determined that soil or weather conditions are unsuitable for spreading and/or grading loam. Resume work with the approval of the Engineer.

Seed all loamed areas within two weeks after spreading the loam. Refer to **SECTION L02** for dates and other requirements. Maintain the loamed areas free from erosion until Project acceptance.

L01.03.2 Plantable Soil.

Furnish plantable soil either from sources outside the Project limits (Plantable Soil Furnished and Spread) or from material removed and stockpiled under the excavation items (Plantable Soil Rehandled and Spread). Place plantable soil according to **Subsection L01.03.1**.

L01.03.3 High Organic Soil.

Furnish high organic soil either from sources outside the Project limits (High Organic Soil Furnished and Spread) or remove and stockpile the material under the excavation items (High Organic Soil Rehandled and Spread). Submit a sample for testing before the placement of high organic soil. The Engineer will approve the sample before placement. High organic soil that does not meet the requirements specified in **SECTION M18** will be rejected.

Use a dozer to track all slopes. Ensure that the resulting tracks are perpendicular to the flow of water. Remove and dispose of all roots, sods, weeds, cobbles, or stones with any dimension greater than 4 in. from the soil surface. Do not rake the soil.

After spreading and tracking the high organic soil, apply a wetland seed mix on the same day. Refer to **SECTION L02** for dates and other requirements.

L01.04 METHOD OF MEASUREMENT.

All materials furnished and spread or rehandled and shaped will be measured by the number of square yards for the surface area on which the loam is placed.

L01.05 BASIS OF PAYMENT.

The Department will pay for the completed and accepted quantities as follows.

Pay Item	Pay Unit
Loam 4-in. Deep	SY
Plantable Soil 4-in. Deep	SY
High Organic Soil 4-in. Deep (Slopes)	SY
High Organic Soil 6-in. Deep (Bottom)	SY

Payment at the Contract unit price is full compensation for all resources, labor, materials; removal and disposal of all roots, sod, weeds, cobbles, or stone with any dimension greater than allowed; trimming and fine grading; and equipment and incidentals required to finish the work, complete and accepted.