INDEX
SPECIFICATIONS - JOB SPECIFIC

CODE	TITLE	PAGE
104.17	Construction Noise and Vibration Pollution Controls	JS-1
106.01	Certification of Materials	JS-5
106.01.1	Buy America Job Specification (BABA)	JS-6
108.03	Prosecution and Progress – Schedule Level	JS-9
108.10	Prosecution and Progress	JS-10
109.07	Partial Payment of Lump Sum Items	JS-11
201.9901	Remove and Stockpile Bridge Closure Traffic Devices	JS-12
202.9901	Contaminated Soil	JS-13
202.9902	Stockpile and Place Riverbed Material	JS-14
703.9901	Cascade Separator CS-5 (STU-A3)	JS-15
703.9902	Infiltration Trench (STU-M1)	JS-17
703.9903	Lined Sand Filter Trench (STU-P1)	JS-17
703.9904	Lined Sand Filter Trench (STU-A1)	JS-17
703.9905	Infiltration Trench (STU-A2)	JS-17
703.9906	Permeable Grass Paver for Erosion Protection	JS-20
712.9901	Installation of Temporary Gas Main – Bridge No. 005201	JS-23
712.9902	Installation of Temporary Gas Main – Bridge No. 005101	JS-23
712.9903	Installation of Temporary Gas Main – Bridge No. 005001	JS-23
712.9904	Installation of New Gas Main – Bridge No. 005201	JS-23
712.9905	Installation of New Gas Main – Bridge No. 005101	JS-23
712.9906	Installation of New Gas Main – Bridge No. 005001	JS-23
800.9901	Ashaway River Bridge No. 050	JS-24
800.9902	Potter Hill Culvert No. 051	JS-26
800.9903	Potter Hill Bridge No. 052	JS-28

CODE	TITLE	PAGE
800.9904	Prefabricated Bridge Units	JS-30
800.9905	Steel Press-Brake-Formed Tub Girder (PBFTG)	JS-36
805.9901	Temporary Earth Retaining System	JS-38
805.9902	Temporary Utility Support System	JS-40
808.9901	Ultra High-Performance Concrete (UHPC)	JS-42
808.9902	Precast Concrete Substructure Elements	JS-57
808.9903	Precast Concrete Culvert	JS-61
808.9904	Cast-in-Place Structure Concrete Masonry	JS-65
920.0330	Riprap R-6. R-7. R-8 Standard 8.3.0	JS-66
938.1000	Price Adjustments	JS-67
L06.9901	Live Stakes	JS-68
L06.9902	Rhodo – Rosebay 2-2.5 Feet	JS-70
L06.9903	Maple – Red 2-2.5 Inch Caliper	JS-70

CODE 104.17
CONSTRUCTION NOISE AND VIBRATION POLLUTION CONTROLS

DESCRIPTION:

The Contractor shall implement comprehensive measures to minimize noise and vibration pollution caused by construction activities. These activities include, but are not limited to, drilling, pile-driving, demolition, excavation, hauling, and the operation of heavy machinery. All noise and vibration mitigation measures shall comply with applicable local, state, and federal regulations and shall be subject to the ongoing approval of the State.

CONSTRUCTION METHODS:

1. Noise Control Plan Submittal and Approval

1.1 Plan Development

The Contractor shall develop a Noise Control Plan prior to the commencement of construction. The plan shall include, but not be limited to, the following elements:

a. The Contractor shall conduct pre-construction noise assessments to establish baseline noise levels and identify potential impacts on surrounding communities.
b. Identification of Noise Sources: A detailed description of all construction activities likely to generate noise (e.g., pile-driving, drilling, excavation, equipment operation).
c. Noise Mitigation Measures: Specific methods and technologies to be used for noise reduction, such as noise barriers, acoustic enclosures, low-noise equipment, and scheduling practices.
d. Monitoring and Reporting: Procedures for monitoring noise levels, the type(s) of monitoring equipment, the location of monitoring equipment, frequency of measurements, and reporting protocols.
e. High-Noise Protocols: Contingency measures for activities that may exceed permissible noise levels, including immediate corrective actions and communication with affected stakeholders.
f. Community Engagement: Strategies for notifying and addressing concerns from nearby residents and stakeholders.

1.2 Plan Submittal

The Contractor shall submit the Noise Control Plan to the State for review and approval no later than 30 days prior to the start of construction. The submittal shall include:

a. A detailed narrative describing the proposed noise control measures.
b. Drawings or diagrams showing the location of noise barriers, monitoring points, and sensitive receptors.
c. Technical specifications for noise control materials and equipment.
d. A schedule for implementing noise control measures.

1.3 Review and Approval

The State shall review the Noise Control Plan within 14 calendar days of receipt. If the plan is approved, the Contractor shall implement the plan as submitted. If the plan requires revisions, the State shall provide written comments, and the Contractor shall resubmit the revised plan within 7 calendar days.

1.4 Plan Implementation

Upon approval, the Contractor shall implement the Noise Control Plan in its entirety. Any modifications to the approved plan shall be submitted to the State for review and approval prior to implementation.

2. Noise Control Measures

2.1 Noise Limits

The maximum allowable noise levels shall be as follows:

- Daytime Limit (7:00 AM – 7:00 PM): 90 dBA (A-weighted) at the nearest residence or occupied building.
- Nighttime Limit (7:00 PM – 7:00 AM): 75 dBA (A-weighted) at the nearest residence or occupied building. Nightwork shall be approved by RIDOT.

If noise levels exceed the applicable limits, the Contractor shall immediately halt the violating activity and implement corrective measures before resuming operations.

Impulse vs. Continuous Noise

- Impulse Noise (e.g., pile driving) shall not exceed 90 dBA at the nearest residence during daytime hours.
- Continuous Noise (e.g., excavation, generators) shall not exceed 85 dBA during daytime and 70 dBA during nighttime hours, following best practices for noise mitigation.
- The Contractor shall schedule high-impact noise activities, such as pile driving, during daytime hours, unless otherwise approved.

2.2 Noise Mitigation Strategies

The Contractor shall employ noise-reducing technologies and practices, including:

a. Installation of noise barriers or curtains around construction zones.
b. Use of low-noise equipment and machinery.
c. Implementation of acoustic enclosures for high-noise operations.
d. Scheduling high-noise activities during daytime hours, avoiding early mornings, evenings, and weekends, unless otherwise approved.
e. For any proposed pile-driving operations, the Contractor shall:

Utilize auger drilling or other mitigation measures for the first 25 feet to minimize noise.
Deploy noise curtains or other sound-dampening systems as required.
Use variable high-frequency hammers (minimum 2000 RPM) to reduce noise and vibration.

2.3 Monitoring and Compliance

The Contractor shall install and maintain real-time vibration and noise monitoring systems at the nearest residence or occupied building to the construction activity that is generating vibration and noise and adjacent to sensitive utilities (i.e., gas mains) within 200’ of the construction work. These locations may change based upon the location of construction activities and more than one location may have monitoring systems based on the number of construction activities generating noise. Noise recording equipment shall have the capability for continuous recording and to send text and email alerts to the Contractor and RIDOT if the noise limits are exceeded. Data from noise monitoring shall be made available to the Owner in real time. If noise levels exceed the limits of Section 2.1, the Contractor shall immediately halt the offending operation and implement corrective measures before resuming work.

3. Vibration Control Measures

3.1 Vibration Limits

The Contractor shall ensure that construction-related vibrations do not exceed peak particle velocity (PPV) of 1 in/sec, or other lower limit established for nearby sensitive structures or structures housing sensitive equipment.

3.2 Vibration Mitigation Strategies

The Contractor shall employ vibration-reducing techniques, as needed to stay within the allowable thresholds, including:

a. Use of cushioned or hydraulic pile-driving systems.
b. Implementation of vibration isolation mats or trench barriers.
c. Adoption of non-impact drilling methods where feasible.

d. The Contractor shall conduct pre-construction vibration assessments to identify sensitive structures (e.g., historic buildings or residential areas) and implement targeted mitigation measures.

3.3 Monitoring and Compliance

The Contractor shall install vibration monitoring equipment at critical locations to measure and record vibration levels during construction. Other monitoring locations include the nearest residence or occupied building to vibration-producing construction activities. Monitoring locations may change based upon the location of construction activities and more than one location may be required to have monitoring systems installed based on the number of construction activities generating vibration and the sensitivity of nearby structures or equipment.

Vibration monitoring equipment shall be capable of measuring vibration accelerations, velocities, and amplitudes in three mutually perpendicular directions in real time. Vibration recording equipment shall have the capability for continuous recording and with automated data transfers and vibration limit alerts (to send text and email alerts to the Contractor and RIDOT if vibration limits are exceeded). Any exceedance of permissible limits shall trigger immediate alert to the project team for immediate corrective action.

4. Community Engagement and Reporting

The Contractor shall develop and implement a Community Noise and Vibration Management Plan to address concerns from nearby residents and stakeholders. Regular updates on noise and vibration monitoring results, mitigation efforts, and construction schedules shall be provided to RIDOT for dissemination to the community.

METHOD OF MEASUREMENT

This item will not be measured for payment.

BASIS OF PAYMENT

The cost of all noise and vibration control measures, including equipment, materials, monitoring, and labor, shall be included in the bid price and shall not be eligible for additional compensation unless otherwise specified in the contract.

Deductions for Non-Compliance

If the Contractor fails to implement adequate noise or vibration control measures or exceeds permissible limits, the State may deduct costs associated with corrective actions or may impose penalties, including:

a. A violation shall be defined as any recorded exceedance of noise and/or vibration limits at a monitored location, measured over a 15-minute averaging period for impulse noise and a one-hour averaging period for continuous noise. Each exceedance event shall be subject to independent assessment, and repeated exceedances within a four-hour period at the same location or operation shall be considered separate violations.
b. A monetary penalty of up to $5,000 per violation for each occurrence of noise and/or vibration limits exceedance.
c. Withholding of progress payments until corrective actions are verified.
d. Suspension of work on non-compliant activities until mitigation measures are properly implemented.
e.

Documentation and Records

The Contractor shall maintain detailed records of:

f. Noise and vibration monitoring data.
g. Mitigation measures implemented.
h. Corrective actions taken.
i. Complaints received and resolutions provided.
j. These records shall be submitted to the State on a monthly basis.

Remove Section 106.01
from the RIDOT Standard Specifications for Road & Bridge Construction, February 2026 in its entirety and replace it with:

CODE 106.01
CERTIFICATION OF MATERIALS

All materials used in the Work shall meet all requirements of the Contract, including the requirements of the "Master Schedule of Testing (MST) for the Preparation of a Project Schedule for Sampling, Testing, and Certification of Materials." All materials are subject to inspection, which includes acceptance sampling and testing, by the Engineer. Results of testing performed by the Contractor shall not substitute for acceptance testing, and shall only be used by the Contractor for Quality Control purposes. All materials shall be new.

The Contractor shall submit a breakdown of materials included in each item set forth in the **Contract Specific Provisions** with estimated quantities required for the Department's use in materials testing and compliance. The breakdown shall be detailed using standard material item codes unless no standard material item code exists. The breakdown shall be submitted on Department approved forms 30 days before work on the item of work begins.

The Department reserves the right to re-inspect any materials at any time before issuing Final Acceptance.

Remove Section 106.01.1 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2026 in its entirety and replace it with:

CODE 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.

CODE 108.03
PROSECUTION AND PROGRESS – SCHEDULE LEVEL

In accordance with **Section 108.03, PROSECUTION AND PROGRESS, Para. a., General Requirements, 1 Project Schedule Program**

The Schedule Level for this contract is Schedule Level B.

CODE 108.10
PROSECUTION AND PROGRESS

There is no Winter Shutdown for this project, the following revisions apply:

101.29 CONTRACT TIME - The number of days allowed for the completion of the Contract or the date by which the Contract shall be completed as stated in the Proposal, including any approved time extensions. The Contract Time **does not include** Winter Shutdown. The terms "Contract Time" and "Contract Completion Date" are used synonymously.

105.14 WINTER SHUTDOWN – This specification is deleted from the contract. This project does not have a winter shutdown.

Phase Completion:

Bridge No. 005051: Ashaway River Bridge - New Bridge Open to Traffic, as defined as all travel lanes shall remain open other than temporary overnight closures.

The following fine/charge for not completing all work on **November 10, 2027 – $3,500** per calendar day**:**

Bridge No. 005251: Potter Hill Bridge - New Bridge Open to Traffic, as defined as all travel lanes shall remain open other than temporary overnight closures.

The following fine/charge for not completing all work on **August 14, 2028 – $3,500** per calendar day**:**

Substantial Completion: The following fine/charge for not completing contract work according to Section 101.89 by **October 23, 2028**, is **$1,950 per day**.

Final Acceptance: All Contract work shall be completed as defined by Section 105.18 by October **23, 2029**, or a **Daily Charge will be deducted from any money due in the amount of $1,950 per day**.

Remove Section 109.07 from the RIDOT Standard Specifications for Road & Bridge Construction, February 2026 in its entirety and replace with:

CODE 109.07
PARTIAL PAYMENT OF LUMP SUM ITEMS

The Contractor shall submit a breakdown of the cost of Lump Sum items to enable the Engineer to make partial payments as the Work is performed. The breakdown shall detail both standard and job specific specification codes associated with the Lump Sum item and estimated quantities for the Department's use for materials testing and compliance in accordance with **106.01**. Lump sum item breakdowns shall be submitted on Department approved forms within 70 days of the Apparent Low Bidder letter so that it can be incorporated into the Step 6 Baseline Schedule – Bid Item Loaded submission. The Engineer reserves the right to reject the Contractor's Lump Sum item breakdown if the breakdown does not fairly represent the Work to be performed and the materials included. The Engineer may make progress payments based on quantities and/or prices determined by the Engineer.

CODE 201.9901
REMOVE AND STOCKPILE BRIDGE CLOSURE TRAFFIC DEVICES

DESCRIPTION:
Under this item the Contractor shall remove, transport and stockpile all bridge closure traffic devices to a State facility. The work shall consist of removing and transporting waterfilled plastic barriers, bridge closed signs, sign stands and traffic cones on Laurel Street at High Street and at Ashaway River Bridge No. 050 and stockpiling these devices at a RIDOT Maintenance facility.

MATERIALS:
The Contractor shall be responsible for damage to the traffic devices incurred during removal and transport to the specified location. All replacements due to damage or loss by the Contractor shall be made at the Contractor's expense.

CONSTRUCTION METHOD:
The Contractor shall remove and transport bridge closure traffic devices to a RIDOT Maintenance facility at 51 Bank St, Hope Valley where they will be stockpiled.

METHOD OF MEASUREMENT:
Remove And Stockpile Bridge Closure Traffic Devices shall be measured as a lump sum.

BASIS OF PAYMENT:
The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Remove And Stockpile Bridge Closure Traffic Devices	LS

CODE 202.9901
CONTAMINATED SOIL

DESCRIPTION:
All excess excavated soil generated by any class of excavation shall be tested for contamination before disposal or exported to another site.

CONSTRUCTION METHOD:
All excavation that generates excess soil that cannot be reused on site under applicable provisions of the RIDOT Standard Specifications shall be stockpiled and tested according to the provisions of Section 215.03.1 of the RIDOT Standard Specifications. If soil is encountered that displays evidence of potential contamination, such as might be indicated by staining, odors, the presence of anthropogenic fill materials such as ash, wood, or metallic debris, or field screening results that indicate the presence of volatile organic vapor at levels above background, the affected soil shall be segregated and characterized separately from material that does not display evidence of potential contamination. The Contractor shall classify each area of excess soil in accordance with Section 202.02.3 of the Standard Specifications.

METHOD OF MEASUREMENT:
"CONTAMINATED SOIL" will not be measured for payment.

BASIS OF PAYMENT**:**
The Department has established "CONTAMINATED SOIL" as an only acceptable bid. "CONTAMINATED SOIL" shall be $1.00 per each. The Department has estimated a quantity of 100,000 each.

CODE 202.9902
STOCKPILE AND PLACE RIVERBED MATERIAL

DESCRIPTION:
The Contractor shall stockpile, handle, and place excavated riverbed material to be spread over riprap for scour protection as shown on the Plans and as directed by the Engineer in accordance with the Rhode Island Standard Specifications for Road and Bridge Construction (latest edition), these Special Provisions, and all applicable permits.

CONSTRUCTION METHODS:

Stockpile excavated rived bed material a minimum of 50 ft from surface waters unless otherwise approved. Install perimeter sediment controls and runoff management according to Sections 206. Construct stockpiles on firm, clean, non-erodible surface. Place geotextile or membrane if needed to prevent subgrade contamination. Cover material as necessary to limit wind/water erosion. Provide dust control according to Section 907.

Backfill riprap for scour protection in the channel and on the embankment, above ordinary high water, with excavated native riverbed material (from stockpile). Dump riverbed material over installed channel riprap to a maximum depth of 2 ft. Place riverbed material on the installed embankment riprap and tamp until all voids are filled. Ensure all embankment riprap is completely covered with placed material to form an evenly graded slope. Continue to place material on the embankment until a grade 4” above the riprap surface is achieved. Feather with low, controlled pushes; use skimming passes with excavator buckets. Keep drop heights low. Maintain completed work until acceptance. Repair areas disturbed by subsequent operations or storm events prior to acceptance.

Reuse excess material on site if it conforms to the requirements of subsection M01.01. Test material prior to final placement on the Project.

METHOD OF MEASUREMENT:

Stockpile and Place Riverbed Material will be measured by the cubic yards in-place as surveyed or calculated from stockpile.

BASIS OF PAYMENT
The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Stockpile and Place Riverbed Material	CY

The price constitutes full compensation for all labor, materials, equipment, tools, stockpiling, handling, environmental protection, placement, grading and shaping, material testing and all other incidentals required to finish the work, complete and accepted.

CODE 703.9901
CASCADE SEPARATOR CS-5 (STU A-3)

DESCRIPTION:
This work consists of furnishing and installing a Cascade Separator CS-5 (STU-A3) complete and operable, and furnishing all labor, equipment, materials, and incidentals as indicated in the plans and details, as described in these Specifications, or as otherwise needed to complete the work shown on the Plans and/or as directed by the Engineer.

MATERIALS:
The housing unit of the Cascade Separator CS-5 shall be constructed of pre-cast concrete, no exceptions. Precast concrete components shall conform to the applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:

- Concrete shall be Class XX and achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi) that conforms to Section 601;
- 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 615, A 185, or A 497.
- Joints shall be sealed with performed 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.

The internal component and appurtenances of the Cascade Separator CS-5 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 applicable sections of ASTM D-4097
- Polypropylene copolymer components shall conform to a tensile strength of 3,600 psi (ASTM D-638), and Izod impact value of “no break” (ASTM D-256).
- Access system(s) conform to the following: Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

CONSTRUCTION METHODS:
Coordinate with utility company representatives prior to beginning work in order to verify and document the horizontal and vertical location of all overhead and underground utility facilities. Verify and document the horizontal and vertical location of RIDOT-owned drainage, lighting, and communication and data systems. Complete construction and installation of new features in dry conditions. Design,

furnish, install, maintain, and remove any required temporary stormwater runoff diversions, sediment controls, dewatering basins, structures, and equipment. Perform all work in accordance with the Plans, the Specifications, and manufacturer's recommendations.

Exercise care in the storage and handling of the stormwater treatment device (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.

Install the SWTD 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. Provide a minimum of 72 hours' notice to the manufacturer prior to their performance of the services included under this subsection.

Fill all voids associated with lifting provisions provided by the manufacturer. Fill these voids with non-shrinking grout providing a finished surface consistent with adjacent surfaces. Trim all protruding lifting provisions flush with the adjacent concrete surface in a manner which leaves no sharp points or edges.

Remove all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

METHOD OF MEASUREMENT:
The Cascade Separator CS-5 (STU-A3) shall be measured per each.

BASIS OF PAYMENT:
The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Cascade Separator CS-5 (STU-A3)	EACH

The price constitutes full compensation for all labor, materials, tools, and equipment for furnishing and placing the units including excavation, dewatering, stone bedding, backfill, compaction, and all other incidentals required to finish the work, complete and accepted.

CODE 703.9902 INFILTRATION TRENCH (STU-M1)
CODE 703.9903 LINED SAND FILTER TRENCH (STU-P1)
CODE 703.9904 LINED SAND FILTER TRENCH (STU-A1)
CODE 703.9905 INFILTRATION TRENCH (STU-A2)

The work under this item shall conform to the relevant sections of the Specifications and the following:

DESCRIPTION:

This work includes constructing the infiltration trench stormwater treatment units (STU-M1 and STU-A2) and lined sand filter trench stormwater treatment units (STU-P1 and STU-A1), including excavation, crushed stone, and filter fabric for infiltration trench stormwater treatment units, and excavation, crushed stone, sand, filter fabric, perforated underdrain pipe within STU and unperforated pipe for drain to outfall, and PVC impermeable liner for lined sand filter trench stormwater treatment units, in reasonably close conformity with the required dimensions and details.

MATERIALS:

Crushed Stone

- Shall be clean, washed stone conforming to gradation listed in Section M1.09, Table 1, Gradation - Percent Passing, Column II

Sand (STU-P1 and STU-A1)

- Shall be ASTM C-33 Sand

Filter Fabric

- Shall be nonbiodegradable, nonwoven, 100% polypropylene black fabric and conforms to Section 703.02.2 and the minimum specifications of Section M20.02

Perforated and Unperforated Pipe (STU-P1 and STU-A1)

- Shall be perforated and unperforated polyvinyl chloride pipe that conforms to Section M04.01.6

PVC Impermeable Liner (STU-P1 and STU-A1)

- Shall conform to Section M04.01.8

CONSTRUCTION METHODS:

The Contractor shall perform the following work:

Coordinate with utility company representatives prior to beginning work to verify and document the horizontal and vertical location of all overhead and underground utility facilities. Verify and document the horizontal and vertical location of RIDOT-owned drainage, lighting, and communication and data systems. Complete construction and installation of new features in dry conditions. Design, furnish, install, maintain, and remove any required temporary stormwater runoff diversions, sediment controls, dewatering basins, structures, and equipment. Perform all work in accordance with the Plans, the Specifications, and manufacturer's recommendations.

The contractor shall excavate, remove and dispose of the existing subgrade and topsoil within limits of the proposed infiltration trench as specified in the Plans. While the infiltration trenches are under construction, the contractor shall ensure the trenches are not subjected to sedimentation and siltation from

erosion using applicable best management practices. Installation of filter fabric shall strictly conform to the manufacturer's guidelines and as modified herein. The surface of the sides of the trench must be smooth and compacted. All rock, dirt clods, grass clumps, trash and other obstructions that will prevent the mat from laying in direct contact with the sides of the trench and which may cause the fabric to puncture, or tear must be removed. A minimum overlap width of two feet must be used. Anchor pins must be installed immediately after placement of each section to protect them from wind uplift.
Following installation of the filter fabric along the vertical sides of the trench, crushed stone shall be placed and backfilled within the trench and well compacted up to the depth specified for the placement of the horizontal layer of filter fabric. The surface of the crushed stone must be smooth upon installation of the horizontal layer of filter fabric to minimize puncture. The top layer of crushed stone shall be installed above the horizontal layer of filter fabric to grade.

Impermeable Liner (STU-P1 and STU-A1)

Place 30-mil impermeable liner as detailed on the Plans, in accordance with the manufacturer's recommendations, and/or as directed by the Engineer.

If dewatering is required to properly install the impermeable liner, design and construct a dewatering system before installing the liner. Use dewatering system that conforms to the applicable requirements of Section 208 of the Specifications.

All surfaces to receive the impermeable liner shall be smooth, free of all foreign and organic material, sharp objects, or debris of any kind. These surfaces shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade.

For the impermeable liner, obtain the general placement requirements, seam and overlap requirements, placement procedures, and repair methods from the manufacturer. Follow all manufacturers' guidelines to ensure proper installation and satisfactory performance. Obtain from the manufacturer and install fully effective prefabricated boots, or an equivalent, to form a permanent watertight seal around any pipe or structure that will pass through the membrane. The final product must be a permanent watertight system. Accomplish field seaming by using either chemical or thermal methods, depending upon manufacturer's recommendations. Effective field seaming is critical in the overall performance of the impermeable liner. The seam must produce the strength and characteristics of the liner, which must not be damaged in the seaming process. Account for environmental factors that may affect proper seam construction, including: ambient temperature, relative humidity, wind uplift, changes in liner temperature, subsurface water content, type of supporting surface, skill of the seaming crew, quality and consistency of chemical or welding materials, preparation of liner surfaces to be joined, moisture at the seam interface, and cleanliness of the seam interface. Test field prior to placement of cover materials. Test procedures shall include visual inspection, non-destructive testing using an air lance or equivalent method, and destructive testing for seam strength and peel adhesion, all in accordance with manufacturer's guidelines. Submit all test results for approval by the Engineer.

Upon acceptance of the test results, carefully cover the impermeable liner with crushed stone, as indicated on the Plans, to prevent damage to the liner.

METHOD OF MEASUREMENT:

The Infiltration Trenches and Lined Sand Filter Trenches shall be measured as a lump sum.

BASIS OF PAYMENT:
The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Infiltration Trench (STU M-1)	LS
Lined Sand Filter Trench (STU P-1)	LS
Lined Sand Filter Trench (STU A-1)	LS
Infiltration Trench (STU A-2)	LS

The price shall constitute full compensation for all labor, materials, tools, equipment, and incidentals necessary to satisfactorily complete this work as described in these Special Provisions and elsewhere in the Contact Documents, complete in-place and accepted.

CODE 703.9906
PERMEABLE GRASS PAVERS FOR EROSION PROTECTION

The work under this item shall conform to the relevant sections of the Specifications and the following:

DESCRIPTION:

This work includes constructing a permeable grass paver for erosion protection in reasonably close conformity with the required dimensions and details.

MATERIALS:

Paver Grid

Use a Paver Grid that conforms to a NDS TT-24 Tuff Track Permeable HDPE Grass Paver or approved equal with the following properties:

- Manufacturer: NDS, Inc., 851 North Harvard Avenue, Lindsay, California 93247. Toll Free 800-726-1994. Phone 559-562-9888. Toll Free Fax 800-726-1998. Fax 559-562-4488. Website www.ndspro.com. Email nds@ndspro.com.
- Use injection-molded, nested-honeycomb, polyolefin plastic-panel pavers for permeable, natural paved environments.
- Use load-bearing paving system.
- Use full rigid base course to prevent pavers from being pressed into subbase
- Use 100 percent recycled polyolefin plastic with carbon black for UV stabilization
- Use 100 percent recyclable content
- Paver Size: 24 inches by 24 inches by 1-1/2 inches high.
- Wall Thickness: 0.12 inches.
- Cells: 2-1/2 inches, 120 per paver, hexagon shape, nested honeycomb
- Bottom of Each Cell: 1-1/4-inch-diameter hole in center, six 0.475-inch by 0.212-inch perimeter slot openings through bottom of paver, one opening at bottom of each cell wall to discourage root girdling within cell.
- Bottom Surface of Pavers: Flat, without vertical posts or obstructions.
- Top Surface of Pavers: Smooth, without notches or grooves.
- Latching System Between Pavers: Tongue-and-groove latching system molded around perimeter lock pavers together, does not require additional parts or tools, tongues 1-inch x 1-inch x 0.12-inch thick, grooves 1-inch x 0.12-inch
- Bottom Open Area: Greater than 41 percent, across entire bottom surface
- Total Bottom Open Area per Paver: Greater than 228 square inches.
- Paver Color: Black.
- Nominal Coverage Area per Paver: 4 square feet.
- Weight per Paver: 4.5 pounds.
- Chemical Resistance: Superior chemical resistance; totally inert.
- Paver Compressive Strength, Empty Cells: 86,563 lbs. (601 psi)
- Paver Compressive Strength, Cells Filled: 400,000 lbs.

Anchors

Use NDS 3/8-inch x 12-inch-long galvanized steel stakes (Part No. GPSTAKES) with Fastenal or equivalent 3/8-inch I.D. x 2” O.D. X 0.406” Thick Fender Washers.

AASHTO #57 Base Stone
Use clean, washed coarse aggregate stone that conforms to 100% passing 1 1/2" screen, 95-100% passing 1" screen, 25-60% passing 1/2" screen, 0-10% passing #4 screen, and 0-5% passing #8 screen,

Filter Fabric
Use nonbiodegradable, nonwoven, 100% polypropylene black fabric that conforms to Section 703.02.2 and the minimum specifications of Section M20.02

Loam
Use loam that conforms to Subsection L01.02

Seed
Use seed that conforms to Subsection L02.02

Erosion Control Blankets
Use erosion control blankets that conform to Subsection L05.02

CONSTRUCTION METHODS:
The Contractor shall perform the following work:

Coordinate with utility company representatives prior to beginning work in order to verify and document the horizontal and vertical location of all overhead and underground utility facilities. Verify and document the horizontal and vertical location of RIDOT-owned drainage, lighting, and communication and data systems. Complete construction and installation of new features in dry conditions. Design, furnish, install, maintain, and remove any required temporary stormwater runoff diversions, sediment controls, dewatering basins, structures, and equipment. Perform all work in accordance with the Plans, the Specifications, and manufacturer's recommendations.

Construction methods shall conform to Subsections 202.03, L01.03, L02.03, L05.03 of the Standard Specifications and the following:

The contractor shall excavate, remove and dispose of the existing subgrade and bituminous pavement or topsoil within limits of the proposed permeable grass paver as specified in the Plans. The contractor shall ensure that the work area is not subjected to sedimentation and siltation from erosion using the best applicable management practices.

Paver installation shall not occur when excavated and exposed subgrade native soil area that is to receive the base course has ponding water or ice.

Trim and fine grade the subgrade for the AASHTO #57 stone and compact to 95 percent of maximum density according to Subsection 202.03.3. Perform this operation before placing the fabric and stone.

Installation of filter fabric shall strictly conform to the manufacturer's guidelines and as modified herein. The surface of the sides of the trench must be smooth and compacted. All rock, dirt clods, grass clumps, trash and other obstructions that will prevent the fabric from laying in direct contact with the sides of the trench and which may cause the fabric to puncture, or tear must be removed. A minimum overlap width of two feet must be used. Anchor pins must be installed immediately after placement of each section to protect them from wind uplift.

Following installation of the filter fabric along the vertical sides of the trench, coarse aggregate stone shall be placed and backfilled within the trench and well compacted to the depth specified. The coarse aggregate stone shall be installed to the bottom of the paver grid graded in a manner to promote surface runoff away from the edge of pavement.

Place AASHTO #57 stone in lifts not to exceed 6 inches and compact with one to three passes of 5-ton steel wheel roller.

Paver Grids

- Install paver grids by placing units with cells facing up and connecting tongue and groove locks. NDS recommends installing pavers in a staggered pattern.
- Clearance: Leave 1-inch-minimum clearance between paver grids and fixed objects or surface structures.
- Top of Cells: Leave top of cells 1/4 inch to 1/2 inch below surface of adjacent hard-surface pavements.
- Re-inspect paver tongue and groove locking prior to filling with topsoil if not filled on same day of installation. Make necessary corrections if displacement has occurred since installation. Remove and replace with new pavers where 3 or more adjacent cells are broken nor damaged.
- Provide a 1-inch minimum horizontal clearance between the roadway edge and the paver grid.

Fill the loam in cells as pavers are laid in sections. Extend the loam inside paver grid an additional 1/2 inch above paver grid surface and match the proposed finished grade. Protect paver grid area until grass is sufficiently established to handle traffic. When loam is properly installed, paver cells will have minimum visibility.

Seed within 30 days of paver grid installation.

Use erosion control blankets to increase soil stabilization and decrease erosion while vegetation takes root. Erosion control blankets may be used in areas where shade or cold temperatures increase seed germination time.

Grid paver work area shall only be opened to traffic when sufficient grass cover has been established to handle traffic.

METHOD OF MEASUREMENT:
The Permeable Grass Paver for Erosion Protection shall be measured by the square yard.

BASIS OF PAYMENT:
The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Permeable Grass Paver for Erosion Protection	SY

The price shall constitute full compensation for all labor, materials, tools, equipment, including excavation, AASHTO #57 base stone, paver grid, filter fabric, loam and seed, compaction, trimming and fine grading, erosion control blankets, removal and disposal of existing pavements, and all incidentals necessary to satisfactorily complete this work complete in-place and accepted.

CODE 712.9901 INSTALLATION OF TEMPORARY GAS MAIN – BRIDGE #005201
CODE 712.9902 INSTALLATION OF TEMPORARY GAS MAIN – BRIDGE #005101
CODE 712.9903 INSTALLATION OF TEMPORARY GAS MAIN – BRIDGE #005001
CODE 712.9904 INSTALLATION OF NEW GAS MAIN – BRIDGE #005201
CODE 712.9905 INSTALLATION OF NEW GAS MAIN – BRIDGE #005101
CODE 712.9906 INSTALLATION OF NEW GAS MAIN – BRIDGE #005001

DESCRIPTION.

This item shall consist of installing temporary by-pass gas mains and new permanent gas mains in accordance with the plans and with this section and shall conform with the additional provisions set forth below.

MATERIALS.

Materials for this work shall conform to the RIDOT Standard Specifications for Road & Bridge Construction, February 2026, with all revisions, together with the additional provisions set forth below. Rhode Island Energy will supply the gas main materials.

CONSTRUCTION METHODS.

The work associated with these items shall be performed by a Rhode Island Energy approved gas subcontractor, see the CS pages. The work shall be in accordance with the requirements indicated on the plans and CS pages. Rhode Island Energy crews will perform activations, cut-off's and tie-ins.

METHOD OF MEASUREMENT.

The installation of these items shall be measured for payment by lump sum.

BASIS OF PAYMENT.

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

Pay Item	Pay Unit
Installation of Temporary Gas Main – Bridge #005201	LS
Installation of Temporary Gas Main – Bridge #005101	LS
Installation of Temporary Gas Main – Bridge #005001	LS
Installation of New Gas Main – Bridge #005201	LS
Installation of New Gas Main – Bridge #005101	LS
Installation of New Gas Main – Bridge #005001	LS

The prices constitute full compensation for all labor, tools, materials and equipment, and all incidentals required to satisfactorily finish the work as described in this Special Provision and elsewhere in the Contract Documents, complete in place and accepted by the Engineer. Partial payments for this Lump Sum item will be made in accordance with Section 109.07.

CODE 800.9901
ASHAWAY RIVER BRIDGE NO. 050

DESCRIPTION:
Except for the excluded items of work indicated below, the work under this item shall consist of constructing Ashaway River Bridge No. 050 in its entirety. This shall comprise all work pertaining to the construction of:

- 800.9904 – Prefabricated Bridge Units
  - 800.9905 – Steel Press-Brake-Formed Tub Girder (PBFTG)
  - 808.1501 - Concrete Superstructure Class HP ¾" Bridge Decks
  - 810.0210 - Galvanized Bar Reinforcement Grade 60
  - 824.2000 - AASHTO M270 Grade 50 Steel Metallized/galvanized and Painted
  - 824.2200 - Welded Stud Shear Connectors 7/8 inch diameter
- 803.0100 – Removal of Existing Bridge-Related Structures
- 805.9901 – Temporary Earth Retaining System
- 805.9902 – Temporary Utility Support System
- 808.0322 – Concrete Substructure Class HP ¾" End Posts
- 808.0502 – Concrete Substructure Class XX ¾" Abut Footing
- 808.0506 – Concrete Substructure Class HP ¾" Abut Stems
- 808.0508 – Concrete Substructure Class XX ¾" Approach Slabs
- 808.0602 – Concrete Substructure Class HP ¾" Backwalls
- 808.1502 – Concrete Superstructure Class HP ¾" Bridge Sidewalks
- 808.1503 – Concrete Superstructure Class HP ¾" Parapets
- 808.9901 – Ultra High-Performance Concrete (UHPC)
- 810.0210 – Galvanized Bar Reinforcement Grade 60
- 813.0100 – Dampproofing
- 813.0210 – Heat-Applied Prefabricated Membrane
- 820.0100 – Concrete Surface Treatment Protective Sealer
- 821.0100 – Saw & Sealing Joints in Asphalt Concrete Pavement
- 823.1750 – Asphaltic Expansion Joint System
- 828.0303 – Elastomeric Bearings Laminated
- 830.1000 – Metal Bridge Railing
- 833.0400 – Granite Identification Tablets
- 834.0100 – Granite Curb for Bridges
- Any other incidental items required

Costs associated with testing, handling, hauling, stockpiling, loading, and proper disposal of contaminated material shall be paid under Item Code 202.9901 "CONTAMINATED SOIL"

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:

- 203.0100 – Structural Excavation Earth
- 203.0510 – Cofferdams
- 203.0700 – Pervious Fill
- 401.3100 – Modified Class 9.5 HMA

- 803.0500 – Temporary Deck Underside and Side Protective Shielding
- 844.0200 – Micropile
- 844.0300 – Verification Load Test
- 844.0400 – Proof Load Test
- 920.0330 – Riprap R-6, R-7, R-8 Standard 8.3.0

METHOD OF MEASUREMENT:

"Ashaway River Bridge No. 050" will not be measured separately for payment.

BASIS OF PAYMENT:

The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Ashaway River Bridge No. 050	LS

The price so stated shall constitute full and complete compensation for all labor, materials, tools, equipment, and all other incidentals required to finish the work as described in this Special Provision and elsewhere in the Contract Documents, complete in place and accepted by the Engineer. Partial payments for this Lump Sum item will be made in accordance with Section 109.07

CODE 800.9902
POTTER HILL CULVERT NO. 051

DESCRIPTION:

Except for the excluded items of work indicated below, the work under this item shall consist of constructing Potter Hill Culvert No. 051 in its entirety. This shall comprise all work pertaining to the construction of:

- 203.0650 – Crushed Stone Fill Under Structures
- 205.1000 – Permanent Steel Sheeting
- 803.0100 – Removal of Existing Bridge-Related Structures
- 805.9901 – Temporary Earth Retaining System
- 805.9902 – Temporary Utility Support System
- 808.0322 – Concrete Substructure Class HP ¾" End Posts
- 808.1503 – Concrete Superstructure Class HP ¾" Parapets
- 808.9903 – Precast Concrete Culvert
- 810.0210 – Galvanized Bar Reinforcement Grade 60
- 813.0100 – Dampproofing
- 820.0100 – Concrete Surface Treatment Protective Sealer
- 833.0400 – Granite Identification Tablets
- Any other incidental items required

Costs associated with testing, handling, hauling, stockpiling, loading, and proper disposal of contaminated material shall be paid under Item Code 202.9901 "CONTAMINATED SOIL"

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:

- 201.0417 – Removal and Disposal of Pavement
- 203.0100 – Structural Excavation Earth
- 203.0310 – Structural Excavation Masonry
- 203.0510 – Cofferdams
- 203.0700 – Pervious Fill
- 208.0102 – Dewatering Basin
- 208.0300 – Dewatering
- 401.1000 – Class 19.0 HMA
- 401.2100 – Modified Class 12.5 HMA
- 920.0330 – Riprap R-6, R-7, R-8 Standard 8.3.0

METHOD OF MEASUREMENT:

"Potter Hill Culvert No. 051" will not be measured separately for payment.

BASIS OF PAYMENT:

The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Potter Hill Culvert No. 051	LS

The price so stated shall constitute full and complete compensation for all labor, materials, tools, equipment, and all other incidentals required to finish the work as described in this Special Provision and elsewhere in the Contract Documents, complete in place and accepted by the Engineer. Partial payments for this Lump Sum item will be made in accordance with Section 109.07

CODE 800.9903
POTTER HILL BRIDGE NO. 052

DESCRIPTION:
Except for the excluded items of work indicated below, the work under this item shall consist of constructing Potter Hill Bridge No. 052 in its entirety. This shall comprise all work pertaining to the construction of:

- 800.9904 – Prefabricated Bridge Units
  - 800.9905 – Steel Press-Brake-Formed Tub Girder (PBFTG)
  - 808.1501 - Concrete Superstructure Class HP ¾" Bridge Decks
  - 824.2000 - AASHTO M270 Grade 50 Steel Metallized/galvanized and Painted
  - 824.2200 - Welded Stud Shear Connectors 7/8 inch diameter
  - 810.0210 - Galvanized Bar Reinforcement Grade 60
- 803.0100 – Removal of Existing Bridge-Related Structures
- 805.9902 – Temporary Utility Support System
- 808.0322 – Concrete Substructure Class HP ¾" End Posts
- 808.0505 – Concrete Substructure Class HP ¾" Wall Stems
- 808.0508 – Concrete Substructure Class XX ¾" Approach Slabs
- 808.0601 – Concrete Substructure Class HP ¾" Piers, Col, Cap
- 808.0602 – Concrete Substructure Class HP ¾" Backwalls
- 808.1502 – Concrete Superstructure Class HP ¾" Bridge Sidewalks
- 808.1503 – Concrete Superstructure Class HP ¾" Parapets
- 808.9901 – Ultra High-Performance Concrete (UHPC)
- 810.0210 – Galvanized Bar Reinforcement Grade 60
- 813.0100 – Dampproofing
- 813.0210 – Heat-Applied Prefabricated Membrane
- 819.0800 – Drill and Grout Reinforcing Dowels
- 820.0100 – Concrete Surface Treatment Protective Sealer
- 821.0100 – Saw & Sealing Joints in Asphalt Concrete Pavement
- 823.1750 – Asphaltic Expansion Joint System
- 828.0303 – Elastomeric Bearings Laminated
- 830.1000 – Metal Bridge Railing
- 833.0400 – Granite Identification Tablets
- 834.0100 – Granite Curb for Bridges
- Any other incidental items required

Costs associated with testing, handling, hauling, stockpiling, loading, and proper disposal of contaminated material shall be paid under Item Code 202.9901 "CONTAMINATED SOIL"

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:

- 203.0100 – Structural Excavation Earth
- 203.0510 - Cofferdams
- 203.0700 – Pervious Fill

- 208.0102 – Dewatering Basin
- 208.0300 – Dewatering
- 401.3100 – Modified Class 9.5 HMA
- 803.0500 – Temporary Deck Underside and Side Protective Shielding
- 817.2112 – Repairs to Structure Concrete Masonry – Patching Mortar
- 920.0330 – Riprap R-6, R-7, R-8 Standard 8.3.0

METHOD OF MEASUREMENT:

"Potter Hill Bridge No. 052" will not be measured separately for payment.

BASIS OF PAYMENT:

The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Potter Hill Bridge No. 052	LS

The price so stated shall constitute full and complete compensation for all labor, materials, tools, equipment, and all other incidentals required to finish the work as described in this Special Provision and elsewhere in the Contract Documents, complete in place and accepted by the Engineer. Partial payments for this Lump Sum item will be made in accordance with Section 109.07

CODE 800.9904
PREFABRICATED BRIDGE UNITS

DESCRIPTION:

This Item shall include the fabrication, storing, handling, preassembling, hauling and delivery, temporary bracing, and installation of the Prefabricated Bridge Units (PBUs), including all necessary materials, labor and equipment to complete the work, as shown on the plans. The PBUs are comprised of a pair of steel beams made composite with a reinforced concrete deck, cast prior to the erection of the PBU. Cast-in-place concrete closure pours shall be used to connect the deck portions of the PBUs.

Items incidental to the PBUs include, but are not limited to, diaphragms/cross frames, connection plates, bearing stiffeners, sole and shim plates, bolsters, shear connectors, reinforcement projecting from the deck, mechanical reinforcing bar splicers, and any other miscellaneous drains and/or attachments as shown on the plans.

All work shall be in accordance with all other specifications and within all limitations that are part of the project.

MATERIALS:

Materials shall conform to the relevant provisions of the RIDOT Standard Specifications and to the following requirements:

a. **Structural Steel:** All structural steel in the superstructure shall conform to the requirements of AASHTO M270, Grade 50. This includes steel girders, sole plates, shim plates, bolsters, connection plates, bearing stiffeners, load plates, and diaphragms.

b. **Steel Fasteners:** Steel Fastener materials shall conform to the requirements of subsection M.05.04.4 of the RIDOT Standard Specifications. High strength bolts shall conform to the requirements of ASTM F3125 Grade A325, Type 1, and shall be hot-dip galvanized in accordance with AASHTO M232 (ASTM A153) Class C.

c. **Bridge Deck Concrete:** Concrete for PBUs shall conform to the type and requirements as shown on the contract plans. The concrete shall conform to the RIDOT Standard Specifications.

d. **Reinforcing Steel and Mechanical Splicers**: Reinforcing steel and mechanical splicers shall conform with Section M.05.01 of the RIDOT Standard Specifications and galvanized in accordance with Section M.05.05 of the RIDOT Standard Specifications.

e. **Shear Connectors:** Shear connectors shall conform to the requirements of Subsection M.05.04.6 of the RIDOT Standard Specifications and shall be of the size shown on the Plans.

f. **Lifting Devices and Leveling Inserts:** Contractor shall select approved lifting devices and leveling inserts for all elements to support the required vertical and horizontal forces with the applicable safety factors according to the Product Handling and Erection Bracing requirements in the PCI Design Handbook.

g. **Metalizing and Painting**: Structural steel shall be metalized and painted in accordance with the RIDOT standard specification section 825 and 827. Paint shall conform to the applicable provisions of Section 825.03.5 of the RIDOT Standard Specifications. Finish coat color shall be semi-gloss Federal Standard 25183.

h. **Other Materials:** All other materials shall meet the requirements specified in the contract documents and are subject to the approval of the Engineer and acceptance of the Department.

If the Contractor proposes to construct any temporary support structures during casting with used materials, the Contractor shall submit for the Engineer's approval documentation of all primary member material that meets the physical properties required by the design. This documentation shall be included in the submission documents specified herein.

Unless otherwise shown in the plans or indicated in the special provisions, welding of structural steel shall be performed in accordance with the latest "ANSI/AASHTO/AWS D1.5 Bridge Welding Code". Complete penetration groove welds in primary members shall be radiographed. All material fabrication shall conform to the AASHTO LRFD Bridge Construction Specifications, except as modified herein or noted on the plans. Fabrication shall be performed by a RIDOT approved/certified fabricator.

CONSTRUCTION METHODS:

The Contractor may elect to procure the PBUs from a precast facility that is listed on the RIDOT approved precast/prestress concrete plants list or precast the PBUs offsite.

Submittals:

1 **Submittals:** Submittals for this Item, requiring written acceptance from the Engineer, are as follows:

a **Shop Drawings:** Prior to any fabrication, the Contractor shall prepare and submit shop and working drawings in accordance with Subsection 105.02 of the RIDOT Standard Specifications. Multiple shop drawings will be required. Structural steel shop drawings to be used in the structural steel fabrication shop, and PBU shop drawings to be used either in the precast facility or at the offsite casting location. The Contractor shall coordinate the preparation of the separate shop drawings to ensure that there are no conflicting details. Acceptance of the shop drawings will be required prior to the ordering of the materials and the fabrication of the prefabricated bridge units.

b **Shop Schedule:** Refer to the RIDOT Standard Specifications.

c **Welding Procedures:** Refer to the RIDOT Standard Specifications.

d **Working Drawings for Falsework and Erection of Structural Steel:** The Contractor is responsible for planning and submitting an Assembly Plan in advance of initiating construction. The Assembly Plan is a document prepared by the Contractor working with a qualified Professional Engineer licensed in the state of Rhode Island with specific knowledge of the Contractor's equipment and means and methods for constructing the elements required to complete the work on the project. The development of this Assembly Plan is closely linked to the schedule of operations and the interim material strengths necessary for the work to progress. The submittal shall be in accordance with Item 105.02 Plans and Shop Drawings. The Contractor shall coordinate the development of the Assembly Plans with the development of the Shop Drawings to ensure consistent detailing. For example, if additional lifting hooks, grout ports, leveling devices, etc. are required, they should be added to the shop drawings prior to final acceptance. The fabrication of the prefabricated bridge units shall not commence prior to the acceptance of the Shop Drawings and the Assembly Plan, unless formally requested by the Contractor and written permission is given by the Engineer. The Department will reject any components that deviate from the accepted drawings.

At a minimum, the Assembly Plan shall include the following information:

i Step by step assembly sequence detailing the overall construction process

ii Details and/or cut sheets of all equipment that will be employed for the assembly of the prefabricated bridge units.

iii Details of all equipment to be used to lift the PBUs including cranes, excavators, lifting slings, sling hooks, and jacks. Crane locations, operation radii, and lifting calculations shall also be included. The factors of safety for the lifting of PBUs will be achieved by using 125% of the weight of the PBU being lifted. The Contractor is responsible for determining the center of gravity for all PBUs. Special care shall be used for PBUs that are not symmetrical. These elements may require special lifting hardware to allow for installation to the grades shown on the plans.

iv The Assembly Plan shall address the potential for tension in the concrete deck during shipping and handling. Allowable tension stresses in the concrete shall be according to Chapter 8 of the PCI Design Handbook (seventh edition). Calculations shall be prepared for the lifting and handling in accordance with the no discernible cracking criteria. Lifting hook locations and hardware shall be coordinated with the Fabricator(s). Any additional reinforcing steel required based on the Contractor's method of handling the PBUs will not be measured separately for payment. Include the minimum required compressive strength of the concrete deck to be attained prior to handling the prefabricated bridge units.

v A statement of compliance with all requirements of applicable environmental permits.

vi A statement of compliance with the construction timeframes specified in the contract documents.

vii A work area plan, depicting all affected utilities, drainage, and protective measures that will be employed throughout the construction activities.

viii The submittal shall be prepared and submitted in PDF format with any plan sheets within the PDF prepared using full size 22"x36" plot sheets depicting the assembly procedures for the PBUs.

ix A detailed schedule with the hourly timeline for all operations. In development of the schedule the Contractor shall account for setting and cure times for non-shrink grout and shall define time duration requirements for the concrete closure pours to achieve their initial compressive strength prior to application of vehicular live loads.

x Methods of adjusting and securing the elements after placement.

xi Procedures for controlling erection tolerances for both the horizontal and vertical direction.

xii Methods of forming closure pours.

xiii Methods for curing closure pours. The Contractor shall include detailed description of curing materials if casting is anticipated during times when wet weather can be anticipated.

xiv Any weather limitations for the assembly work.

xv The Assembly Plan shall be one complete document and shall be prepared and stamped by a registered Professional Engineer licensed in the State of Rhode Island.

xvi The Contractor shall develop a control plan for the geometry for the assembly of the prefabricated elements, and it shall be included in the Assembly Plan submittal. The plan shall indicate in detail how the geometry of the structure during erection will be controlled, and the actions required to assure proper erection of the structure to the dimensions and final grades shown on the plans.

xvii The control plans shall include lines and grades of the layout process (lines, marks, survey, etc.) that will be used by the erection personnel for checking the location and elevation of each element prior to releasing the element from the erection equipment.

xviii The plans shall include provisions for regular monitoring of the structure during erection, and methods for adjusting geometry should unacceptable deviations occur.

xix The plans shall include provisions for monitoring settlement of falsework supported on shallow foundations. The plans shall also address adjustment to the falsework should settlement occur.

2 **Fabrication:** At a minimum, the following requirements shall be met for fabrication of the PBUs:

a The PBUs shall be constructed to tolerances shown on the plans. Where tolerances for the concrete deck are not shown, follow tolerance limits in the PCI MNL 116-99, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products, 4th Edition". Elements that are found to be out of tolerance may be subject to rejection. Rejection of the elements may be waived by the Engineer if the Contractor can demonstrate that the out of tolerance element can be installed without significant modifications to the bridge and does not compromise the structural integrity of the element. For example, an over width element may be acceptable if the adjacent element is under width.

b The fabricator and/or Contractor shall prevent cracking or damage of the PBUs during handling, storage, transportation, and final installation in permanent position.

c Members that sustain damage or surface defects during fabrication, handling, storage, hauling, or erection are subject to review and may be rejected.

i Proposed repair procedures must be submitted to the Engineer for acceptance before performing repairs.

ii Repair work must re-establish the elements' structural integrity, durability, and aesthetics to the satisfaction of the Engineer.

iii Determine the cause when damage occurs and take corrective action.

iv Failure to take corrective action, leading to similar repetitive damage, can be cause for rejection of all subsequent damaged elements.

v Cracks that extend to the nearest reinforcement plane and fine surface cracks that do not extend to the nearest reinforcement plane but are numerous or extensive are subject to review and may be rejected.

3 **Quality Control:** At a minimum, the following requirements shall be met:

a The Contractor shall provide field survey to verify that the PBUs are placed in the field within the horizontal and vertical tolerances stated on the plans.

b The Contractor shall be responsible for interim testing of concrete and grouts placed in the field to allow the work to proceed with various stages of construction. As an example, if the approved Assembly Plan allows for loads to be placed on the PBU after the closure pour concrete has achieved a compressive strength of 1000 psi, the Contractor will be required to test the concrete documenting that the strength has been achieved. All testing furnished by the Contractor shall be performed by an AASHTO accredited laboratory. All Quality Control test results shall be submitted to the Engineer for review. Additional testing completed by the Contractor shall be performed at no additional cost to the State nor will this work be measured for payment. The plant shall document all test results. The quality control file shall contain at least the following information:

i Element identification

ii Date and time of casting

iii Concrete cylinder test results (Compressive Strength, Slump and Air Content)

iv Quantity of used concrete and the batch printout

v Form-stripping date

vi Repairs if applicable. See section 2 (d) above

vii Location/number of blockouts and lifting inserts

viii Temperature and moisture of curing period recorded at one-hour intervals

ix Document lifting device details, requirements, and inserts

4 **Marking:** Permanently mark each prefabricated bridge unit with the date of casting and supplier identification. Stamp markings in fresh concrete should be accessible but not visible to the Public. Marking method and location shall be included in the working drawings for approval.

5 **Handling and Storage:** All storage and handling operations shall be provided by the Contractor and approved by the Engineer. Materials for this work shall be stored off the ground before, during, and after fabrication. The PBUs shall be kept free from dirt, grease and other contaminants and shall be protected from corrosion. Care shall be taken during storage, transporting, hoisting and handling of the PBUs to prevent damage to any part of the PBU. Sections damaged by improper storing, transporting or handling shall be repaired or replaced by the Contractor in accordance with Section 2 (d) above, as directed by the Engineer and at no cost to the State.

6 **Dry Fit prior to Shipment:** The Contractor has two options to ensure the proper fit up of the PBUs when placed on the bridge substructure.

Option 1: Fabricate PBUs individually using geometric controls to maintain vertical and horizontal tolerances at closure pours. A dry fit of adjacent elements prior to shipment is required to ensure that they can be properly joined in the field.

Option 2: Fabricate the total number of PBUs, required to make up the full bridge width, together on temporary supports in the same orientation as they will end up in their final location supported by the bridge substructure. A separate dry fit of the PBUs is not required prior to shipping the PBUs.

7 **Installation:** The Contractor's field personnel shall be well versed and have an in-depth knowledge of the accepted Assembly Plan. If changes are warranted due to varying site conditions, the contractor shall resubmit the plan for review and approval.

Working points, working lines, and benchmark elevations shall be established prior to placement of all elements. The Contractor is responsible for field survey as necessary to complete the work. The Engineer reserves the right to perform additional independent survey. This survey does not relieve the Contractor from performing survey for the construction. If discrepancies are found, the Contractor is required to verify previous survey data and submit findings at no additional cost to the State.

The PBUs shall be placed in the sequence and according to the methods contained in the Assembly Plan. The height of each element shall be adjusted to acceptable tolerances by means of leveling devices or shims. The Contractor shall ensure that the PBU is stable and in the proper horizontal and vertical alignment prior to releasing from the crane and setting the next unit. Vertical tolerance must be checked at the top surface of the PBU.

8 Erection Tolerances:

a Plan Alignment: Location and Clearances

Note: the accumulation of maximum or minimum tolerances when multiple elements are joined may result in final overall dimensions that do not conform to the final dimensions shown on the contract plans. The Contractor must specifically design the element dimensions and tolerances to prevent this.

The Contractor shall adhere to the following tolerances for the final condition of the PBU after placement:

i Do not exceed ¼" deviation of width measured from a common reference point.

ii Do not exceed ¼" maximum deviation at each end of the span from overall longitudinal working line after setting.

iii Do not exceed ¼" maximum deviation from overall transverse working line (i.e. longitudinal position) at each line of bearings.

iv Do not exceed ¼" deviation from specified erection elevation.

v In the absence of other constraints, keep individual elements or surfaces within 1/4 inch of location with respect to similar matching surfaces.

b Bridge Bearings: Elevation and Location

Installation of the elastomeric bridge bearings shall be in accordance with section 828.03.1.d of the RIDOT Standard Specifications and the following:

The Contractor shall keep the elevation of individual bridge bearings within plus or minus 1/8 inch of required elevations. The plan location of bridge bearings shall be within a tolerance of 1/8 inch and the alignment within plus or minus 1/16 inch across the bearing.

If tolerances are not met, the Contractor must submit a Corrective Actions Work Plan providing means to adjust elevations, correct for, or accommodate errors/unintended deviations from required tolerances to the Engineer for approval before proceeding with construction.

METHOD OF MEASUREMENT:

"Prefabricated Bridge Units" will not be measured separately for payment.

BASIS OF PAYMENT:

"Prefabricated Bridge Units" will be paid for under Item Code 800.9901, "Ashaway River Bridge No.050" and Item Code 800.9903 "Potter Hill Bridge No.052", which price shall include fabricating, storing, handling, preassembling, hauling, delivering, temporarily bracing, erecting, and installing the PBUs including all materials, tools, equipment and labor incidental thereto.

CODE 800.9905
STEEL PRESS-BRAKE-FORMED TUB GIRDER (PBFTG)

DESCRIPTION:

This Item shall include the fabrication, storing, handling, preassembling, hauling and delivery, temporary bracing, and installation of Steel Press-Brake-Formed Tub Girders (PBFTG) including all necessary materials, labor and equipment to complete the work, as shown on the plans.

Items incidental to the PBFTGs include, but are not limited to, diaphragms/cross frames, connection plates, bearing stiffeners, sole and shim plates, bolsters, shear connectors, and any other miscellaneous attachments as shown on the plans.

All work shall be in accordance with all other specifications and within all limitations that are part of the project except as modified herein.

MATERIALS:

Materials shall conform to the relevant provisions of the RIDOT Standard Specifications and to the requirements of other applicable Job-Specific Specifications included in the Contract Documents.

CONSTRUCTION METHODS:

The PBFTGs shall be manufactured by an AISC Certified Bridge Fabricator – Intermediate (IIBR).

1 **Submittals:** Submittals for this Item, requiring written acceptance from the Engineer, are as follows:

   a **Shop Drawings:** Prior to any fabrication, the Contractor shall prepare and submit shop and working drawings in accordance with Subsection 105.02 of the RIDOT Standard Specifications. The Contractor shall coordinate the preparation of the shop drawings to ensure that there are no conflicting details with other works. Acceptance of the shop drawings will be required prior to the ordering of the materials and the fabrication of the prefabricated bridge units.

   b **Shop Schedule:** Refer to the RIDOT Standard Specifications.

   c **Welding Procedures:** Refer to the RIDOT Standard Specifications.

2 **Fabrication:** Fabricate PBFTGs per the AASHTO LRFD Bridge Construction Specifications and the RIDOT Standard Specifications for Road and Bridge Construction and the following:

   a Cold Bending: Cold bend structural steel per the current ASHTO LRFD Bridge Construction Specifications except the minimum bend radii for cold-bending (at room temperature), measured concave to the face of the plate, shall be taken as 5.0 times the thickness of the base plate metal.

   b Inspection Hatch Opening: Provisions shall be made to ensure interior visual inspection and drainage of girders. Inspection hatch cover(s) shall rotate to allow entry.

   c Handling: Handle the PBFTG by a method approved by the manufacturer and Engineer. Do not drill holes in the PBFTG for lifting or handling

   d Product Marking: Clearly mark the following information on the interior of each PBFTG with a steel ID tag seal welded to the member, or other means approved by the Engineer, at a location easily visible through the inspection hatch: Assembly part number, Customer order number and Shop order number.

METHOD OF MEASUREMENT:

PBFTGs will not be measured separately for payment.

BASIS OF PAYMENT:

PBFTGs will be paid for under Item Code 800.9901, “Ashaway River Bridge No. 050” and Item Code 800.9903 “Potter Hill Bridge No. 052”, which price shall include materials, fabricating, storing, handling, preassembling, hauling, delivering, temporarily bracing, erecting, and installing the PBFTGs including all materials, tools, equipment and labor incidental thereto.

CODE 805.9901
TEMPORARY EARTH RETAINING SYSTEM

DESCRIPTION:

All temporary earth retaining systems project-wide are the responsibility of the Contractor, including but not limited to their need, assessment, selection, design, construction, maintenance, operation, and removal. The temporary earth retaining system shall be any type of adequately braced temporary retaining wall which the Contractor elects to build, to satisfy the condition that existing or planned facilities be properly retained during excavation or placement of fill including support of traffic as necessary. The temporary earth retaining system shall be designed by the Contractor and constructed where shown on the plans. The Contractor shall remove this system upon completion of the permanent work, unless the Engineer allows some sections to remain in place.

MATERIALS:

Materials shall be in conformance with the RIDOT Standard Specifications.

- Steel sheet piling shall meet the requirements of Subsection M.07.04.
- Timber sheet piling shall meet the requirements of M.07.01 or M.07.02.
- Materials other than steel or timber, or a combination of these may be used provided they are properly designed for the purpose intended. Systems utilizing other material(s) shall meet the manufacturer's specifications and Project specifications. The parts list shall be furnished for the proprietary system and the Contractor shall provide Materials Certificates for the parts.

CONSTRUCTION METHODS:

The temporary earth retaining system shall be safely designed and shall be carried to adequate depths and braced as necessary for proper performance of the work. Construction shall be such as to permit excavation or fill as required. Interior dimensions shall be such as to give sufficient clearance for construction of forms and their inspection, and for battered pile clearance when necessary. Movements of the system or bracing which prevent the proper completion of the substructure shall be corrected at the sole expense of the Contractor. No part of the temporary earth retaining system or bracing shall be allowed to extend into the substructure without written permission of the Engineer.

The installation of sheet piling or soldier piling shall be in accordance with Section 805 of the RIDOT Standard Specifications.

Working drawings and design calculations for the temporary earth retaining system shall be submitted in accordance with the requirements of Section 105.02 Plans and Shop Drawings. The working drawings and design calculations shall be prepared, sealed, and signed by a Professional Engineer, licensed in the State of Rhode Island. The furnishing of such plans shall not serve to relieve the Contractor of any part of its responsibility for the safety of the work or for the successful completion of the Project.

Unless otherwise ordered by the Engineer, all parts of the temporary earth retaining system shall be removed and properly disposed of upon completion of the work for which it was provided. The excavation shall be backfilled and properly compacted, prior to removal of the system, unless otherwise permitted by the Engineer.

The Contractor must submit a formal written request to the Engineer seeking permission providing adequate details, information, and reasons for abandoning the temporary earth retaining system for approval. If

approved, the Contractor must remove all systems to remain at least 1-foot below finished grade or as directed by the Engineer.

METHOD OF MEASUREMENT:

"Temporary earth retaining system" will not be measured separately for payment.

BASIS OF PAYMENT:

"Temporary Earth Retaining System" will be paid for under Item Code 800.9901, "Ashaway River Bridge No. 050" and Item Code 800.9902 "Potter Hill Culvert No. 051" which price shall include all design, materials, equipment and labor incidental to the construction and removal of the temporary earth retaining system required at the locations specified on the plans and as required to complete the work; including removal of obstructions, repair and correction, adjustments or reconstruction required by the plans.

CODE 805.9902
TEMPORARY UTILITY SUPPORT SYSTEM

DESCRIPTION:

All temporary utility support systems project-wide are the responsibility of the Contractor, including but not limited to their selection, design, construction, maintenance, operation, and removal and coordination with the carried utility. The temporary utility support system shall be any type of structure or system which the Contractor elects to build, to satisfy the condition that existing or planned facilities be properly supported during all phases of construction to the satisfaction of the utility owner. The temporary utility support system shall be designed by the Contractor and constructed where shown on the plans. The Contractor shall remove this system upon completion of the permanent work, unless the Engineer allows some sections to remain in place.

MATERIALS:

Materials shall be in conformance with the RIDOT Standard Specifications.

- Materials other than steel, concrete or timber, or a combination of these may be used provided they are properly designed for the purpose intended. Systems utilizing other material(s) shall meet the manufacturer's specifications and Project specifications. The parts list shall be furnished for the proprietary system and the Contractor shall provide Materials Certificates for the parts.

CONSTRUCTION METHODS:

The temporary utility support system shall be safely designed using the AASHTO LRFD Bridge Design Specifications. The following design parameters are assumed and shall be confirmed with the utility owner:

<u>Temporary Gas Bypass</u>

- Type: 2" steel gas line (April 1 to December 15), 4" steel gas line if bypass is required outside these dates.
- Max Gas Line Support Spacing: 13 feet (2" steel gas line), 17 feet (4" steel gas line)
- Gas Line Load: 20 lb/ft minimum unfactored dead load

All other requirements (lateral deflection, vertical deflection, other loads, support types, protection systems, etc.) shall be obtained from and coordinated with the utility owner and included in the design of the temporary utility support system

Working drawings and design calculations for the temporary earth retaining system shall be submitted in accordance with the requirements of Section 105.02 Plans and Shop Drawings. The working drawings and design calculations shall be prepared, sealed, and signed by a Professional Engineer, licensed in the State of Rhode Island. The furnishing of such plans shall not serve to relieve the Contractor of any part of its responsibility for the safety of the work or for the successful completion of the Project.

Unless otherwise ordered by the Engineer, all parts of the temporary utility support system shall be removed and properly disposed of upon completion of the work for which it was provided.

The Contractor must submit a formal written request to the Engineer seeking permission providing adequate details, information, and reasons for abandoning any portion of the temporary utility support system for approval. If approved, the Contractor must remove all systems to remain at least 1-foot below finished

grade or as directed by the Engineer.

METHOD OF MEASUREMENT:

"Temporary utility support system" will not be measured separately for payment.

BASIS OF PAYMENT:

"Temporary Utility Support System" will be paid for under Item Code 800.9901, "Ashaway River Bridge No. 050", Item Code 800.9902. "Potter Hill Culvert No. 051" and Item Code 800.9903 "Potter Hill Bridge No. 052" which price shall include all design, materials, equipment and labor incidental to the construction and removal of the temporary utility support system required at the locations specified on the plans and as required to complete the work; including removal of obstructions, repair and correction, adjustments or reconstruction required by the plans.

CODE 808.9901

ULTRA-HIGH PERFORMANCE CONCRETE (UHPC)

DESCRIPTION:

This section applies to UHPC intended for use in closure pours between PBUs and at other locations as specified on the contract drawings. The work performed under this section includes all labor, material, equipment, related services, and supervision required for the manufacture of the UHPC work shown on the contract drawings.

A. The following definitions apply to terms in this section.

1. **Acceptance testing**: Testing performed by RIDOT during production to verify that the UHPC complies with the requirements of the project specifications and other contract documents. Acceptance testing considers the specific lot of materials, batch proportions, batching procedures, and production methods used to produce the UHPC member.
2. **Batch**: A volume of materials placed into a mixer and uniformly blended, then discharged.
3. **Binder:** The combination of hydraulic cement, supplementary cementitious materials, and mineral fillers included in a UHPC mixture.
4. **Flexural strength**: The maximum tensile stress value sustained by a test specimen due to bending when tested in accordance with ASTM C1856.

   First-peak (first-crack) flexural strength: The stress value obtained at the first point on the flexural load-deflection curve where the slope is zero; this typically corresponds to the stress value at the time of first cracking.

   Peak flexural strength: The maximum engineering stress value obtained in a flexural test, computed using simple bending theory for linear elastic materials and gross (uncracked) section properties.

   Residual flexural strength: The engineering stress value obtained, after cracking, at a specified net deflection (for example, $L/150$, where L is span length in test) in a flexural test. Residual flexural strength is computed using simple bending theory for linear elastic materials and gross (uncracked) section properties.
5. **Flow spread**: The distance of lateral flow of UHPC during a flow test conducted in accordance with ASTM C1437 using modifications described in ASTM C1856.
6. **Informational testing**: Testing that is not required by project specifications but is performed to obtain additional information about material properties or durability characteristics of the UHPC.
7. **Material Identity Card**: A manufacturer's document that provides the details of the constituent materials, mixture proportions, mixing instructions, curing methods (including thermal treatment, if used), and resulting hardened properties of a specified UHPC mixture.
8. **Mineral filler**: A finely divided inorganic material, usually derived from quarried stone that may be used in UHPC to improve certain properties.
9. **Preblend**: A uniform mixture of powder constituents into which water and admixtures are added during batching. Fibers may or may not be included in the preblend.

10. **Qualification testing**: Testing performed by the Contractor prior to production to characterize the performance of a UHPC mixture and to demonstrate that the material can meet all Project requirements. Qualification testing considers the mixture components, proportions, mixing procedures, curing, and thermal treatment intended to be used for the Project.
11. **Total water**: The combination of the batched water and ice, free moisture added from (or removed by) the aggregates, and the liquid water portion of all chemical admixtures and silica fume slurry.
12. **Ultra-high-performance concrete (UHPC)**: A fiber-reinforced cementitious material characterized by highly refined microstructure, post-cracking ductility, high tensile strength, high compressive strength, and excellent durability properties.
13. **Water-binder ratio *w*/*b***: The weight of total water in a UHPC mixture divided by the weight of total binder.
14. **Working time**: The period of time after the introduction of water during mixing, over which a UHPC mixture maintains a flow spread of at least 8 in. (200 mm). Working time will vary with ambient conditions, concrete temperature, mixing procedures, and transport methods.

Referenced Standards

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO R 72-16—*Standard Practice for Match Curing of Concrete Test Specimens*

AASHTO T 217-14—*Standard Method of Test for Determination of Moisture in Soils by Means of a Calcium Carbide Gas Pressure Moisture Tester*.

AASHTO T 255-00—*Standard Method of Test for Total Evaporable Moisture Content of Aggregate by Drying*

American Petroleum Institute (API)

SPEC 10A—*Specification for Cements and Materials for Well Cementing*, 25th edition (includes addendum)

ASTM International

ASTM A820/A820M-16—*Standard Specification for Steel Fibers for Fiber-Reinforced Concrete*

ASTM C31/C31M-21a—*Standard Practice for Making and Curing Concrete Test Specimens in the Field*

ASTM C33/C33M-18—*Standard Specification for Concrete Aggregates*

ASTM C39/C39M-21—*Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*

ASTM C138/C138M-17a—*Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete*

ASTM C144-18—*Standard Specification for Aggregate for Masonry Mortar*

ASTM C150/C150M-21—*Standard Specification for Portland Cement*

ASTM C157/C157M-17—*Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete*

ASTM C191-19—*Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle*

ASTM C192/C192M-19—*Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory*

ASTM C469/C469M-14e1—*Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression*

ASTM C494/C494M-19—*Standard Specification for Chemical Admixtures for Concrete*

ASTM C512/C512M-15—*Standard Test Method for Creep of Concrete in Compression*

ASTM C566-19—*Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying*

ASTM C595/C595M-21—*Standard Specification for Blended Hydraulic Cements*

ASTM C618-19—*Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete*

ASTM C642-13—*Standard Test Method for Density, Absorption, and Voids in Hardened Concrete*

ASTM C666/C666M-15—*Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*

ASTM C989/C989M-18a—*Standard Specification for Slag Cement for Use in Concrete and Mortars*

ASTM C1012/C1012M-18b—*Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution*

ASTM C1064/C1064M-17—*Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete*

ASTM C1116/C1116M-10a(2015)—*Standard Specification for Fiber-Reinforced Concrete*

ASTM C1202-19—*Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration*

ASTM C1218/C1218M-20—*Standard Test Method for Water-Soluble Chloride in Mortar and Concrete*

ASTM C1240-20—*Standard Specification for Silica Fume Used in Cementitious Mixtures*

ASTM C1437-20—*Standard Test Method for Flow of Hydraulic Cement Mortar*

ASTM C1556-11a(2016)—*Standard Test Method for Determining the Apparent Chloride Diffusion Coefficient of Cementitious Mixtures by Bulk Diffusion*

ASTM C1602/C1602M-10—*Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete*

ASTM C1609/C1609M-19a—*Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading)*

ASTM C1778-20—*Standard Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete*

ASTM C1797-17—*Standard Specification for Ground Calcium Carbonate and Aggregate Mineral Fillers for Use in Hydraulic Cement Concrete*

ASTM C1856/C1856M-17—*Standard Practice for Fabricating and Testing Specimens of Ultra-High Performance Concrete*

ASTM D4944-18—*Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester*

ASTM D7508/D7508M-20—*Standard Specification for Polyolefin Chopped Strands for Use in Concrete*

Precast/Prestressed Concrete Institute (PCI)

PCI MNL-116—*Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products*

Rhode Island Department of Transportation (RIDOT)

RIDOT *Standard Specifications for Road and Bridge Construction (latest edition)*

MATERIALS:

Material Identity Card

A. Submit a Material Identity Card for each mixture to be used in the Project. The properties listed in the material identity card shall demonstrate, at a minimum, compliance with all project material property requirements.

B. The material identity card shall include the following:

1. The type and source of each constituent material.
2. The mixture proportions.
3. Mixing procedures.
4. Curing procedures.

C. The properties of the PCI-UHPC in accordance with “Requirements for Fresh UHPC” and “Requirements for Hardened UHPC”.

1. Reported properties shall include, at a minimum, all properties indicated in **Table 1** as “Qualification” and “Informational (mandatory)” tests.
2. Additional properties and performance characteristics listed as “Informational (optional)” in **Table 1** may be reported for informational purposes. Informational (optional) test results may be included in project submittals but are not required for approval.
3. Include the date of testing; the temperature, flow spread, and unit weight (density) of each batch produced for qualification purposes; the number of tests; the mean result of all tests; the standard deviation of results for each test; and the name, address, and contact information of the laboratory where the testing was performed.

D. An updated Material Identity Card, based on data no older than two years, shall be prepared and submitted to the Department for approval every two years.

UHPC Materials

A. Use the same type, brand, and mill source for all materials throughout the UHPC production. Changes in the type or source of cementitious materials, mineral fillers, aggregates, admixtures, or

fibers require the submittal and approval of an updated Material Identity Card for the modified UHPC mixture produced with the alternative material type(s) or source(s).

B. Hydraulic cement: ASTM C150, ASTM C595, or API SPEC 10A.

C. Supplementary cementitious materials and mineral fillers:

1. Fly ash: ASTM C618, Class C or F.
2. Raw or calcined natural pozzolan: ASTM C618, Class N.
3. Silica fume: ASTM C1240.
4. Slag cement: ASTM C989.
5. Ground calcium carbonate and aggregate mineral fillers: ASTM C1797.
6. Other supplementary cementitious materials or mineral fillers: Demonstrate suitable mechanical and durability performance when used in UHPC. Suitability to be determined at the discretion of the Department.

D. Fine aggregates: ASTM C33 or ASTM C144.

1. Fine aggregates do not need to comply with the grading requirements in ASTM C33 or ASTM C144.
2. Aggregates that are potentially expansive by alkali-silica reaction, as defined by ASTM C1778, shall not be used.
3. Aggregates that are potentially expansive by alkali-carbonate reaction, as defined by ASTM C1778, shall not be used.

E. Water and ice: Potable municipal water or other water for concrete and water used to make ice shall comply with chemical limits of PCI MNL-116 or ASTM C1602.

F. Chemical admixtures: Certified by manufacturer to be compatible with other admixtures and do not contain calcium chloride, or more than 0.15% chloride ions by weight of admixture.

1. Water-reducing admixture: ASTM C494/C494M, Type A.
2. Retarding admixture: ASTM C494/C494M, Type B.
3. Water-reducing and retarding admixture: ASTM C494/C494M, Type D.
4. Water-reducing and accelerating admixture: ASTM C494/C494M, Type E.
5. High-range, water-reducing admixture: ASTM C494/C494M, Type F.
6. High-range, water-reducing, and retarding admixture: ASTM C494/C494M, Type G.
7. Viscosity- or rheology-modifying admixture: ASTM C494/C494M, Type S.
8. Shrinkage-reducing admixture: ASTM C494/C494M, Type S.

G. Steel fibers: ASTM A820/A820M, with a minimum tensile strength of 290 ksi (2000 MPa) and a minimum nominal aspect ratio of 60, unless otherwise approved by the Department based on demonstrated adequate performance of the fibers when used in UHPC.

H. Nonmetallic fibers:

1. Polypropylene fibers: ASTM D7508/D7508M
2. Polyvinyl alcohol fibers: Comply with fiber requirements in ASTM C1116/C1116M Section 4.1.3: Type III Synthetic Fiber-Reinforced Concrete.

I. Preblended UHPC materials for which a Material Identity Card has been approved by the Department.

1. Follow all Manufacturer's recommendations for handling, mixing, and placing.
2. Retain a sample of the preblended material from each lot received, in sufficient quantity that the quality control testing of the fresh and hardened properties of the material may be evaluated for compliance.

CONSTRUCTION METHODS:

Strength Test Records

A. Submit documentation indicating that the proposed mixture proportions will produce average compressive and flexural strengths equal to or greater than the required average compressive and flexural strengths, respectively.

1. The minimum required average compressive and flexural strengths shall be determined as defined in "Mixture Qualification" based on the standard deviation of test results and the specified strengths.

B. Documentation shall consist of strength test records as defined in "Mixture Qualification.

C. When strength and performance data exist for established concrete mixture proportions, the mixture proportions may be used on the basis of past test results if no more than two years has passed since testing, the concrete is made from the same material sources, and the same mixing, curing, and thermal treatment procedures will be used for the Project.

Material Test Reports

A. Mill or suppliers' test certificates or compliance test reports shall be submitted for the following materials:

1. Cementitious materials.
2. Mineral fillers.
3. Aggregates.
4. Water (for concrete batching).
5. Chemical admixtures.
6. Fibers.
7. Other components specified in Contract Documents with applicable standards.

Quality Control Test Reports

A. Submit quality control test reports as described in "Tests and Inspection".

Mixture Proportions

A. Proportion mixtures with materials to be used on Project to provide UHPC with the following characteristics:

1. Maximum water-binder ratio w/b: 0.20

2. Minimum steel fiber content: 2% steel fibers, by volume of concrete (263 lb/yd3 [156 kg/m3]).
3. Maximum water-soluble chloride ions: ASTM C1218/C1218M, 0.06% by weight of cement.
4. Minimum fresh properties: As defined in "Requirements for Fresh UHPC"
5. Working time: As needed for element fabrication.
6. Minimum hardened properties: As defined in "Requirements for Hardened UHPC".
7. Minimum durability properties: As defined in "Requirements for Hardened UHPC".

Requirements for Fresh UHPC

A. The fresh UHPC shall have the following properties:
   1. Temperature: ASTM C1064; between 50°F and 80°F at the time of placement, unless otherwise approved by the Department.
   2. Flow spread: ASTM C1437 as modified by ASTM C1856; 8 to 10 in measured not earlier than 15 minutes before anticipated placement time.

Requirements for Hardened UHPC

A. The hardened UHPC shall have the following mechanical properties:
   1. Compressive strength: ASTM C39 as modified by ASTM C1856, with the exception that either 3- or 4-in. diameter specimens may be used.

      At service (28 days): 14.0 ksi minimum.
   2. Flexural performance: ASTM C1609 as modified by ASTM C1856, at service (28 days).

      First-peak (first-crack) flexural strength: 1500 psi, minimum.

      Peak flexural strength: 2000 psi, minimum.

      Peak flexural strength shall be at least 1.25 times first-peak (first-crack) flexural strength.

      Residual flexural strength at midspan deflection of L/150: 75% of first-peak flexural strength, minimum.

B. The hardened UHPC shall exhibit the following durability characteristics:
   1. Indication of resistance to chloride ion penetration: ASTM C1202 as modified by ASTM C1856, at 28 days; 250 coulombs maximum.

      When UHPC mixture contains metallic fibers, testing shall be performed on specimens produced from UHPC having the same relative proportions as the other constituent materials but produced without metallic fibers.
   2. Chloride diffusion coefficient: ASTM C1556, at 28 days; 0.025 $in.^2$/year.

      When UHPC mixtures contain metallic fibers, testing shall be performed on specimens produced from UHPC having the same relative proportions of the other constituent materials but produced without metallic fibers.

      Expose specimens to test solution for 90 days.
   3. Sulfate resistance: ASTM C1012, at 28 days.

If the UHPC mixture contains metallic or nonmetallic fibers, testing shall be performed on specimens produced from UHPC having the same relative proportions as the other constituent materials but produced without fibers.

Comply with the expansion limits defined in ACI 318 for the specified exposure condition.

4. Resistance to freezing and thawing: ASTM C666 as modified by ASTM C1856; minimum relative dynamic modulus of 95 after 300 cycles.
5. Absorption: ASTM C642, at 28 days; 3.0% maximum.

Mixture Qualification

A. Material testing of each UHPC mixture shall be performed to support preparation of a Material Identity Card and strength test records, as defined in "Material Identity Card", for the purpose of mixture qualification.

B. Testing for mixture qualification shall include, at minimum, the properties listed as "Qualification" and "Informational (mandatory)" in **Table 1**.

1. All test specimens shall be fabricated from UHPC mixtures produced with the same materials, mixture proportions, batching equipment, and mixing sequence intended for the Project.
2. Document the temperature, flow spread, and unit weight for each batch produced for mixture qualification. The temperature and flow spread of the UHPC shall be within the specified range at the time of specimen fabrication.
3. Where knowledge of working time is desired, working time may be determined as follows:

   Measure flow spread according to ASTM C1437 as modified by ASTM C1856 at 15-minute intervals following initial measurement until two consecutive measurements of less than 8 in are recorded.

   Working time is established when the flow spread equals 8 in as determined by linear interpolation.
4. Cure test specimens to match the required curing for the structural product.

   If a thermal treatment will be applied to the product, apply the same thermal treatment to all test specimens, in accordance with ASTM C1856, Section 7.4.

Table 1: Qualification and Informational Test Requirements

Property	Test method	Purpose of test*
Flow spread	ASTM C1437 as modified by ASTM C1856	Qualification
Temperature	ASTM C1064	Qualification
Unit weight	ASTM C138 as modified in "Mixture Qualification"	Informational (mandatory)
Working time	ASTM C1437 as adapted in "Mixture Qualification"	Informational (optional)
Time of set	ASTM C191 as modified by ASTM C1856	Informational (optional)

Compressive strength	ASTM C39 as modified by ASTM C1856	Qualification
Flexural strength	ASTM C1609 as modified by ASTM C1856	Qualification
Static modulus of elasticity	ASTM C469 as modified by ASTM C1856	Informational (mandatory)
Poisson's ratio	ASTM C469 as modified by ASTM C1856	Informational (optional)
Creep in compression	ASTM C512 as modified by ASTM C1856	Informational (optional)
Length change	ASTM C157 as modified by ASTM C1856 and "Mixture Qualification"	Informational (optional)
Indication of resistance to chloride ion penetration	ASTM C1202 as modified by ASTM C1856, with tests performed on specimens without metallic fibers	Qualification
Chloride diffusion coefficient	ASTM C1556, with tests performed on specimens without metallic fibers	Informational (mandatory)
Sulfate resistance	ASTM C1012, with tests performed on specimens without metallic fibers	Informational (mandatory)
Resistance to freezing and thawing	ASTM C666 as modified by ASTM C1856	Qualification
Absorption	ASTM C642	Informational (mandatory)

*Qualification tests are required for mixture approval. Informational (mandatory) tests are required for submittal but are not required for mixture approval. Informational (optional) tests may be performed and reported at the discretion of the producer but are not required for submittal or approval.

5. Number of tests:

   A test shall be as defined as in "Tests and Inspection".

   Unless otherwise specified, a minimum of nine compressive strength tests and nine flexural strength tests shall be performed to establish the Material Identity Card. The tests shall represent a minimum of three consecutive batches, with no more than three tests performed for each batch.

   Unless otherwise specified, a minimum of one test shall be performed for all other properties and performance characteristics to be reported.

C. Required average strength:

1. Determine the required average strength for the following properties, as defined below, based on the specified strengths defined in "Requirements for Hardened UHPC" and the sample standard deviations of the test results:

Compressive strength f'_{cr}

First-peak (first-crack) flexural strength f'_{1r}

Peak flexural strength f'_{pr}

2. Calculate the sample standard deviation s_S of the test records.

3. Calculate the required average strengths based on the test records as follows. Use the larger of the two values calculated.

$$f'_{Xr} = max \begin{bmatrix} f'_X + 1.34ks_s \\ 0.9f'_{Xr} + 2.33ks_s \end{bmatrix}$$

where

$\boldsymbol{f'_{Xr}}$ = required average strength for the property *X*

X = *c* for compressive strength, *X* = 1 for first-peak flexural strength, and *X* = *p* for peak flexural strength

$\boldsymbol{f'_X}$ = specified strength for the property *X* in accordance with "Requirements for Hardened UHPC"

k = a modification factor listed in Table 2 to adjust for the number of tests considered in calculating the sample standard deviation

s_S = sample standard deviation

4. The sample standard deviation used to determine the required average compressive strength, first-peak flexural strength, or peak flexural strength shall be determined from a minimum of nine consecutive tests, with no more than three tests performed from a single batch.

Table 2: k-factor for increasing sample standard deviation based on number of tests

Total number of tests considered	*k*-factor for increasing sample standard deviation
9	1.25
15	1.16
20	1.08
25	1.03
30 or more	1.00

Note: Linear interpolation for intermediate number of tests is acceptable.

D. Modifications to standard methods for UHPC:

1. Fabricate and cure test specimens for qualification and laboratory trial mixtures in accordance with ASTM C192 as modified by ASTM C1856 and this specification.

2. Unit weight: ASTM C138, except the measure shall be filled in a single, continuous pour, and consolidated by tapping 30 times with a rubber mallet.

3. Length change: ASTM C157 as modified by ASTM C1856, except that the initial reading shall be taken at the time of final set or at 24 hours, whichever occurs later. Begin drying immediately after initial reading.

Production

Forms

A. Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete placement and vibration operations and temperature changes.

1. Design formwork to withstand the full hydrostatic pressure of fresh UHPC.
2. The minimum clear spacing between the formwork surface and any internal reinforcing or adjacent formwork shall be greater than both 1.5 times the fiber length and 1.5 times the maximum aggregate size.

Concrete

A. Do not produce UHPC for construction production until the Material Identity Card has been reviewed and approved by the Department.

Storage and Handling of Concrete Materials

A. Comply with PCI MNL-116 requirements, with the following modifications:

1. Store and handle all supplementary cementitious materials and mineral fillers in a similar manner to cement.
2. Store and handle aggregates in a wet or dry manner that limits segregation.
3. Store fibers in a dry, covered location to prevent oxidation (steel fibers) or ultraviolet (UV) degradation (nonmetallic fibers). Some surface oxidation (rust) of steel fibers is permissible, provided that the fibers remain as individual wires (that is, do not clump) and the severity of the oxidation is documented. Discoloration of nonmetallic fibers may indicate UV degradation; therefore, discolored nonmetallic fibers shall not be used. Elevate fibers stored in bags or sacks on pallets or racks to limit exposure to moisture.
4. Store preblended materials in a similar manner to cement. If preblending materials on site, oven-dry aggregates before blending to limit prehydration of the cementitious materials.

Mixing

A. Equipment: Comply with PCI MNL-116 requirements and tolerances for all batching equipment, including scales, water meters, dispensing equipment, and concrete mixers.

B. Mixing: Comply with PCI MNL-116 requirements for batching and mixing, with the following modifications:

1. Mixing time requirements specified in PCI MNL-116 do not apply to UHPC. The time from the start of UHPC mixing to placement may exceed 1 hour, as long as the flow requirements are met and the water-binder ratio of the approved mixture proportions is not exceeded.
2. Clean the mixer between consecutive batches of UHPC if the mixer is not loaded within the working time of the previous batch.
3. If aggregates are used in a moist (that is, not oven-dry) condition, measure the aggregate moisture content for each batch. Determine moisture content by calibrated moisture probe, rapid measurement technique (ASTM D4944 or AASHTO T 217), oven-drying (ASTM C566 or AASHTO T 255), or other approved method. Calibrate moisture probes and rapid measurement techniques for each aggregate source.
4. Total water content shall include all sources of water in UHPC, including batch water, ice, moisture content in aggregates, and water fraction of admixtures.

5. Total binder shall include the combined weight of hydraulic cement, supplementary cementitious materials, and mineral fillers.
6. The batching sequence and mixing procedures shall produce uniform dispersion of the constituent materials and fibers, and achieve the fresh properties required for transporting and placing the UHPC. The batching sequence and mixing procedures do not need to comply with the requirements of PCI MNL-116.

   Uniformity of dispersion shall be evaluated, at a minimum, by visual inspection of the fresh UHPC at the time of discharge from the mixer. A well-dispersed UHPC mixture will have no fiber clumps and no agglomerates of the powder constituents.
7. Batch materials within tolerances listed in **Table 3**.

Table 3: Batching Tolerances

Material	Maximum batching error with plant-batched dry materials	Maximum batching error with preblended dry materials
Water	±1%	±1%
Cement	±1%*	±2%
Silica fume	±1%*	
Other supplementary cementitious materials or mineral fillers	±1%* or ±5 lb, whichever is greater	
Aggregates	±2%*	
Chemical admixtures	±2%	±2%
Fiber	–2%, +4%	–2%, +4%

Note: 1 lb = 0.454 kg.

*Total weight of dry materials shall not exceed ±2% of target.

C. Mixture adjustments:

1. Adjustments to water or admixture dosages may be performed to achieve target flow properties. The maximum water-binder ratio in the submitted and approved mixture design shall not be exceeded.
2. No adjustments to the mixture shall be made after the concrete is discharged from the mixer.
3. Changes to the constituent materials, mixture proportions, batching equipment, or curing methods will require resubmittal of the Material Identity Card to verify compliance with Project requirements. To limit production delays, provisional approval may be granted at the discretion of the Department before strength results at service have been obtained.

Transporting, Placing, and Consolidating Concrete

A. Comply with PCI MNL-116 requirements for transporting and placing concrete, with the following modifications:

1. The temperature of the UHPC at the time of placement shall be between 50°F and 80°F, unless otherwise approved by the Department based on local experience.
2. Place the UHPC in a continuous operation that prevents cold joints or planes of weakness from forming, limits fiber segregation, and reduces the entrapment of air.
3. Use placement methods that limit unfavorable alignment of fibers where possible. Because fibers tend to align in the direction of the UHPC flow, avoid placement methods that cause the UHPC to flow in a direction that is perpendicular to the direction of tensile stress if so directed by the Department.
4. Place the UHPC in a manner that integrates the new material into the previously placed UHPC.
5. Limit free-fall placement to a maximum of 3 ft above the top of the form.

B. Comply with all PCI MNL-116 requirements for hot- and cold-weather concrete placements.

C. Thoroughly consolidate the UHPC without dislocating or damaging the reinforcement (including fibers) and built-in items. Minimize pour lines, honeycombing, and entrapped air voids on the surface. Use consolidation equipment and procedures complying with PCI MNL-116 requirements, with the following modifications:

1. Do not use internal vibration.
2. Use external vibration when concrete workability is not sufficient to complete placement or if complex forming may inhibit flow. If external vibration is used, evaluate whether a detrimental effect on fiber distribution is expected.

Finishing

A. Strike off or screed the surfaces of the UHPC product to the required level immediately after placement. Finish as required by the project contract documents.

Curing

A. After finishing, immediately cover all surfaces with plastic, wet burlap, or curing compound to prevent dehydration. Cure the concrete according to PCI MNL-116 requirements, either by moisture retention without heat or by accelerated heat curing using live steam or radiant heat and moisture. Maintain a minimum relative humidity of 95% if curing with live steam or radiant heat and moisture.

1. Accelerated heat curing, if used, shall be started after the concrete has attained initial set, determined in accordance with ASTM C1856.
2. Cure members until compressive strength is high enough to ensure that stripping does not influence the performance or appearance of the final product.

B. The compressive strength at stripping shall be determined according to “Requirements for Hardened UHPC”.

Tests and Inspection

Quality Control Testing

A. Modifications to standard methods for UHPC:

1. Fabricate and cure test specimens in accordance with ASTM C31 or ASTM C192, as modified by ASTM C1856 and this specification. Curing shall match the specified curing for the structural product.

2. Unit weight: ASTM A138, except the measure shall be filled in a single, continuous pour, and consolidated by tapping 30 times with a rubber mallet.

B. Test and inspect UHPC according to PCI MNL-116 requirements when used to fabricate precast elements, with the following modifications:

1. A test for strength and other hardened properties of the UHPC shall be defined as the average results from at least three specimens made from the same concrete sample and tested at the same age.
2. Perform temperature, flow spread, unit weight, compressive strength, and flexural strength testing as defined in **Table 4**.
3. If test specimens are match cured, follow procedures of AASHTO R 72, except that the specimen sizes, specimen molding, and other testing are as defined herein.
4. Minimum testing frequencies are listed in **Table 4**. Perform additional testing and cast additional samples if a change in quality is suspected.
5. Acceptance of concrete testing shall be as per PCI MNL-116 except the strength of the concrete shall be considered satisfactory provided that both of the following requirements are met:

   Every average of three consecutive strength tests equals or exceeds the specified strength fX for the property.

   No single strength test result falls below fX by more than 0.10 fX .

Table 4: Minimum Testing Frequencies

Property	Test method	Minimum frequency
Flow spread	ASTM C1437 as modified by ASTM C1856	Each batch.
Temperature	ASTM C1064	Each batch.
Unit weight	ASTM C138 as modified in “Tests and Inspection”	First batch per day, whenever test specimens are cast, and whenever a change in quality is suspected.
Compressive strength	ASTM C39 as modified by ASTM C1856	6 test specimens from 1 batch per day per element, or every 25 yd^3, whichever is more frequent. Test 3 cylinders at release and 3 cylinders at an age defined by the Department.
Flexural strength	ASTM C1609 as modified by ASTM C1856	3 beams from 1 batch per day per mixture design. If volume exceeds 25 yd^3, an additional 3 beams are required. Test at an age defined by the Department.

Note: 1 in. = 25.4 mm; 1 yd^3 = 0.765 m^3.

C. Concrete records: Maintain records of concrete operations consistent with PCI MNL-116 requirements, with the following additions:

1. Maintain reports of each batch of UHPC produced, including quantities of materials weighed, the batching sequence used, the time that concrete was discharged from the mixer, and the time that concrete was placed into the forms.
2. Record all testing performed as specified in **Table 4**.
3. Maintain records of any additional testing performed, including any strength testing performed at ages other than at release and at an age defined by the Department.

D. Evaluate the potential for fiber segregation and settlement during production or as part of a trial placement.

1. Fabricate a specimen mold with a height greater than or equal to the height of the element to be produced, a width equal to that to be used for element, and a length of 1 ft.
2. Place concrete into the specimen mold and consolidate using the same transport, placement, and consolidation methods used for production.
3. After the specimen has hardened, saw cut the specimen along the centerline over the full height of the specimen. Inspect the cut surface for nonuniform dispersion, including fiber settlement.
4. If nonuniform settlement is identified, establish a lower allowable limit on flow spread for production of elements of the test height or greater.

Production Mock-Up

A. To verify that placement and consolidation methods do not adversely affect UHPC uniformity, including fiber distribution and alignment, produce a mock-up element using the placement and consolidation methods intended for the Project.

B. Evaluate uniformity of UHPC fiber at locations specified by the Department using one of the following methods.

1. Cut or core specimens from the concrete at locations specified by the Department. Characterize the fiber density and alignment using techniques approved by the Department.

METHOD OF MEASUREMENT:

UHPC will not be measured separately for payment.

BASIS OF PAYMENT:

“Ultra-High-Performance Concrete (UHPC)” will be paid for under Item Code 800.9901 “Ashaway River Bridge No. 050” and Item Code 800.9903 “Potter Hill Bridge No. 052”, which price is full compensation for all resources, labor, materials, equipment, testing, and incidentals required to finish the work, complete and accepted.

CODE 808.9902

PRECAST CONCRETE SUBSTRUCTURE ELEMENTS

DESCRIPTION:

Work under this Item shall be in accordance with Section 601 of the RIDOT Standard Specifications for Road and Bridge Construction.

This Item shall include the fabrication, delivery, and installation of the precast concrete substructure elements in accordance with the Contract Drawings. Also included with this Item is the development and subsequent approval of an Assembly Plan prior to initiating construction.

All materials, equipment and labor needed to construct precast footings/pile caps, precast wall/abutment stems, and precast approach slabs are included in this item.

Installation of the elements shall include leveling of the elements and the placement of the grout beneath the elements and within the voids in the elements, as shown on the plans. The costs of the grout shall be incidental to this item. Due to the accelerated nature of this project, all precast elements shall be cast and accepted prior to the initiation of the first stage of construction.

MATERIALS:

Concrete

Concrete shall be Class HP ¾" f'c = 5,000 psi.

Leveling Devices

Approved leveling devices to support the anticipated loads shall be installed and located, as needed, by the Contractor. The locations of leveling devices shall be coordinated and complemented with the lifting and handling calculations for the element.

Non-Shrink Grout

Non-shrink grout shall be on the RIDOT Approved Materials List and conform to the following:

1. Section 819.02.2
2. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (nonshrink)

The contractor may elect to use Controlled Low Strength Material – Non Excavatable in place of grout. The contractor must demonstrate the material will meet the same strength requirements in conjunction with the proposed construction schedule and assembly plan. Controlled Low Strength Material shall be type IV, very flowable & non-excavatable in accordance with Section 603 of the RIDOT Standard Specification.

Reinforcing Steel and Mechanical Splicers

Reinforcing steel and mechanical splicers shall conform with Section M.05.01 of the RIDOT Standard Specifications and galvanized in accordance with Section M.05.05 of the RIDOT Standard Specifications.

CONSTRUCTION METHODS:

Submittals:

The submittals requiring written approval from the Engineer are as follows:

1. Assembly Plan:

   At a minimum, the Assembly Plan shall include:

   a. The Assembly Plan and calculations shall be prepared by a registered Professional Engineer licensed in the State of Rhode Island.

   b. The submittal shall be prepared and submitted in PDF format with any plan sheets within the PDF prepared using full size 22”x36” plot sheets depicting the assembly procedures for the precast substructure elements.

   c. The Contractor shall analyze all elements for lifting and handling. The calculations shall include removal from the forms, yard handling, storage, shipping, and final setting on leveling devices. Follow Chapter 8 of the PCI Design Handbook for handling and erection bracing requirements. The elements shall be analyzed for “no discernable cracking” as outlined in the PCI Design Handbook.

   d. Include a work area plan, depicting items such as utilities overhead and below the work area, drainage inlet structures, and protective measures.

   e. Include details of all equipment that will be employed for the assembly of the substructure elements.

   f. Include details and calculations of all equipment to be used to lift substructure elements including cranes, excavators, lifting slings, sling hooks, and jacks. Include crane locations, operation radii, and lifting calculations.

   g. Include a detailed sequence of construction and a timeline for all operations. Account for setting and cure time for non-shrink grouts. Include required interim material strengths required during the assembly of the bridge. Account for all anticipated construction equipment loadings.

   h. Include methods of providing temporary support of the elements. Include methods of adjusting and securing the element after placement.

   i. Include procedures for controlling tolerance limits both horizontal and vertical.

   j. Include methods for placement of non-shrink grout for under and between the approach slabs. Add additional PVC ports in the slabs to facilitate the bedding process, if required.

2. Precast Element Shop Drawings and Working Drawings:

   a. Submit shop drawings for each element.

   b. Submit working drawings and calculations stamped by a Professional Engineer licensed in the State of Rhode Island.

   c. Show all lifting inserts, hardware, dowel bar splicers or devices and locations on the shop drawings for Engineer’s approval.

   d. Show locations and details of the lifting devices, including supporting calculations, type, and amount of any additional reinforcing required for lifting. Design all lifting devices based on the no cracking criteria in Chapter 5 of the PCI Design Handbook.

   e. Show minimum compressive strength attained prior to handling the precast elements.

f. Show Details of vertical adjusting hardware if used.

g. The Contractor shall develop a control plan for the geometry for the assembly of the prefabricated elements, and it shall be included in the Assembly Plan submittal. The plan shall indicate in detail how the geometry of the structure during erection will be controlled, and the actions required to assure proper erection of the structure to the dimensions and final grades shown on the plans.

h. The control plans shall include lines and grades of the layout process (lines, marks, survey, etc.) that will be used by the erection personnel for checking the location and elevation of each element prior to releasing the element from the erection equipment.

i. The plans shall include provisions for regular monitoring of the structure during erection, and methods for adjusting geometry should unacceptable deviations occur.

j. The plans shall include provisions for monitoring settlement of falsework supported on shallow foundations. The plans shall also address adjustment to the falsework should settlement occur.

Process and Quality Control:

1. The precast elements shall be fabricated by a RIDOT approved precast concrete facility.
2. Permanently mark each precast element with date of casting and supplier identification. Stamp markings in fresh concrete. Markings shall be placed so as to be accessible during construction but not visible to the public in its final location.
3. Prevent cracking or damage of precast elements during storage, handling, and installation.
4. Defects and damages to precast elements shall be corrected by the contractor. The management of resolution of non-conformances during fabrication and handling shall be in accordance with the Guidelines for Resolution of Non-Conformances in Precast Concrete Bridge Elements (PCINE-18-RNPCBE).
    a. Contractor is responsible for all costs associated with repairing or replacing members which sustain damage or have surface defects during fabrication, handling, storage, hauling, or erection, as determined by the Engineer.
    b. Submit a repair plan to the Engineer for approval before performing repairs.
    c. Repair work must reestablish the elements' structural integrity, durability, and aesthetics to the satisfaction of the Engineer. Elements that don't have their structural integrity, durability, and aesthetics reestablished as determined by the Engineer will be rejected.
    d. Determine the cause when damage occurs and take corrective action to prevent subsequent occurrences.
5. Construct and erect precast elements to tolerances shown on the plans.
6. The contractor will document all test results. The quality control file will contain at least the following information;
    a. Element identification
    b. Date and time of cast
    c. Concrete cylinder test results; including, Strength and Air Content, at a minimum.
    d. Quantity of placed concrete and the batch printout

e. Form-stripping date and repairs if applicable

f. Location/number of blockouts and lifting inserts

g. Continuous readings of ambient Temperature and moisture of curing period.

h. Ambient conditions when the elements were cast. Reading intervals at one hour or less.

i. Document lifting device details, requirements, and inserts

Installation of Precast Concrete Elements:

1. The Fabricator shall dry fit elements prior to shipment to ensure that the elements can be properly joined in the field.
2. The Contractor shall review the approved Assembly Plan. If changes are warranted due to varying site conditions, resubmit the plan for review and approval. Establish working points, working lines, and benchmark elevations prior to placement of all elements.
3. Check the condition of the receiving bonding surface prior to connecting elements and take any/all necessary measures to remove items such as dust, rust, debris, and other contaminates to provide the satisfactory bonding required between the protruding reinforcing bars and the element. All surfaces shall be checked and verified to be sound matching the approved submittals prior to proceeding. Surfaces found to be unsound shall be repaired or replaced in accordance with bullet 4 of "Quality Assurance Precast Substructure Elements."
4. Place elements in the sequence and according to the methods outlined in the assembly plan. Adjust the height of each element by means of leveling devices or shims.

METHOD OF MEASUREMENT:

"Precast Concrete Substructure Elements" will not be measured separately for payment.

BASIS OF PAYMENT:

"Precast Concrete Substructure Elements" will be paid for under Item Code 800.9901, "Ashaway River Bridge No. 050" and Item Code 800.9903, "Potter Hill Bridge No. 052" and shall include all tools, material, equipment, labor and work incidental to the construction.

CODE 808.9903
PRECAST CONCRETE CULVERT

DESCRIPTION:

Work under this Item shall be in accordance with Section 809 of the RIDOT Standard Specifications for Road and Bridge Construction.

This Item shall include the design, fabrication, delivery, and installation of the precast concrete culvert in accordance with the Contract Drawings. Also included with this Item is the development and subsequent approval of an Assembly Plan prior to initiating construction, as well as a full as-built load rating.

All materials, equipment and labor needed to construct precast footings, precast culvert segments, precast headwalls and precast wingwalls are included in this item.

Installation of the elements shall include leveling of the elements and the placement of the grout beneath the elements and within the voids in the elements as per the Contractor's design. The costs of the grout shall be incidental to this item. Due to the accelerated nature of this project, all precast elements shall be cast and accepted prior to the initiation of the first stage of construction.

DESIGN:

The precast culvert shall be designed by the Contractor in accordance with the AASHTO LRFD Bridge Design Specifications, 10th Edition (AASHTO LRFD), Section 12.14, and the RIDOT Bridge Design Manual (excluding seismic provisions, for which AASHTO LRFD will govern). The design live load shall be HL-93.

The Contractor shall design the wingwalls, headwalls, and the connection of headwalls to precast culvert segments in accordance with AASHTO LRFD.

The precast culvert shall also be load rated in the as-built condition in accordance with the latest edition of the RIDOT Bridge Load Rating Guidelines.

CONSTRUCTION METHODS:

Submittals:

The submittals requiring written approval from the Engineer are as follows:

1. Design

   The Contractor shall submit design calculations and drawings in accordance with the RIDOT Standard Specifications Section 105.02. Design calculations and drawings shall be signed and sealed by a Professional Engineer registered in the State of Rhode Island; the signing entity will assume the responsibility of the Engineer of Record for all components included in the submission.

2. Assembly Plan:

   At a minimum, the Assembly Plan shall include:

   a. The Assembly Plan and calculations shall be prepared by a registered Professional Engineer licensed in the State of Rhode Island.

b. The submittal shall be prepared and submitted in PDF format with any plan sheets within the PDF prepared using full size 22”x36” plot sheets depicting the assembly procedures for the precast substructure elements.

c. The Contractor shall analyze all elements for lifting and handling. The calculations shall include removal from the forms, yard handling, storage, shipping, and final setting on leveling devices. Follow Chapter 8 of the PCI Design Handbook for handling and erection bracing requirements. The elements shall be analyzed for “no discernable cracking” as outlined in the PCI Design Handbook.

d. Include a work area plan, depicting items such as utilities overhead and below the work area, drainage inlet structures, and protective measures.

e. Include details of all equipment that will be employed for the assembly of the substructure elements.

f. Include details and calculations of all equipment to be used to lift substructure elements including cranes, excavators, lifting slings, sling hooks, and jacks. Include crane locations, operation radii, and lifting calculations.

g. Include a detailed sequence of construction and a timeline for all operations. Account for setting and cure time for non-shrink grouts. Include required interim material strengths required during the assembly of the bridge. Account for all anticipated construction equipment loadings.

h. Include methods of providing temporary support of the elements. Include methods of adjusting and securing the element after placement.

i. Include procedures for controlling tolerance limits both horizontal and vertical.

3. Precast Element Shop Drawings and Working Drawings:

a. Submit shop drawings for each element.

b. Submit working drawings and calculations stamped by a Professional Engineer licensed in the State of Rhode Island.

c. Show all lifting inserts, hardware, dowel bar splicers or devices and locations on the shop drawings for Engineer’s approval.

d. Show locations and details of the lifting devices, including supporting calculations, type, and amount of any additional reinforcing required for lifting. Design all lifting devices based on the no cracking criteria in Chapter 5 of the PCI Design Handbook.

e. Show minimum compressive strength attained prior to handling the precast elements.

f. Show Details of vertical adjusting hardware if used.

g. The Contractor shall develop a control plan for the geometry for the assembly of the prefabricated elements, and it shall be included in the Assembly Plan submittal. The plan shall indicate in detail how the geometry of the structure during erection will be controlled, and the actions required to assure proper erection of the structure to the dimensions and final grades shown on the plans.

h. The control plans shall include lines and grades of the layout process (lines, marks, survey, etc.) that will be used by the erection personnel for checking the location and elevation of each element prior to releasing the element from the erection equipment.

i. The plans shall include provisions for regular monitoring of the structure during erection, and methods for adjusting geometry should unacceptable deviations occur.

j. The plans shall include provisions for monitoring settlement of falsework supported on shallow foundations. The plans shall also address adjustment to the falsework should settlement occur.

Process and Quality Control:

1. The precast elements shall be fabricated by a RIDOT approved precast concrete facility.
2. Permanently mark each precast element with date of casting and supplier identification. Stamp markings in fresh concrete. Markings shall be placed so as to be accessible during construction but not visible to the public in its final location.
3. Prevent cracking or damage of precast elements during storage, handling, and installation.
4. Defects and damages to precast elements shall be corrected by the contractor. The management of resolution of non-conformances during fabrication and handling shall be in accordance with the Guidelines for Resolution of Non-Conformances in Precast Concrete Bridge Elements (PCINE-18-RNPCBE).

    e. Contractor is responsible for all costs associated with repairing or replacing members which sustain damage or have surface defects during fabrication, handling, storage, hauling, or erection, as determined by the Engineer.

    f. Submit a repair plan to the Engineer for approval before performing repairs.

    g. Repair work must reestablish the elements' structural integrity, durability, and aesthetics to the satisfaction of the Engineer. Elements that don't have their structural integrity, durability, and aesthetics reestablished as determined by the Engineer will be rejected.

    h. Determine the cause when damage occurs and take corrective action to prevent subsequent occurrences.

5. Construct and erect precast elements to tolerances shown on the design plans.
6. The contractor will document all test results. The quality control file will contain at least the following information;

    j. Element identification

    k. Date and time of cast

    l. Concrete cylinder test results; including, Strength and Air Content, at a minimum.

    m. Quantity of placed concrete and the batch printout

    n. Form-stripping date and repairs if applicable

    o. Location/number of blockouts and lifting inserts

    p. Continuous readings of ambient Temperature and moisture of curing period.

    q. Ambient conditions when the elements were cast. Reading intervals at one hour or less.

    r. Document lifting device details, requirements, and inserts

Installation of Precast Concrete Elements:

1. The Fabricator shall dry fit elements prior to shipment to ensure that the elements can be properly joined in the field.
2. The Contractor shall review the approved Assembly Plan. If changes are warranted due to varying site conditions, resubmit the plan for review and approval. Establish working points, working lines, and benchmark elevations prior to placement of all elements.
3. Check the condition of the receiving bonding surface prior to connecting elements and take any/all necessary measures to remove items such as dust, rust, debris, and other contaminates to provide the satisfactory bonding required between the protruding reinforcing bars and the element. All surfaces shall be checked and verified to be sound matching the approved submittals prior to proceeding. Surfaces found to be unsound shall be repaired or replaced in accordance with bullet 4 of "Quality Assurance Precast Culvert."
4. Place elements in the sequence and according to the methods outlined in the assembly plan. Adjust the height of each element by means of leveling devices or shims.

METHOD OF MEASUREMENT:

"Precast Concrete Culver" will not be measured separately for payment.

BASIS OF PAYMENT:

"Precast Concrete Culvert" will be paid for under Item Code 800.9902, "Potter Hill Culvert No. 051" and shall include all tools, material, equipment, labor and work incidental to the construction.

CODE 808.9904

CAST-IN-PLACE STRUCTURE CONCRETE MASONRY

Add the following to Section 808.05 of the RIDOT Standard Specifications for Road & Bridge Construction, August 2026:

Provisions for hot and cold weather concrete placements are incidental to the work being performed and are not measured or paid separately.

CODE 920.0330

RIPRAP R-6. R-7. R-8 STANDARD 8.3.0

Add the following to Section 920 of the RIDOT Standard Specifications for Road & Bridge Construction, February 2026:

Provisions for a survey of the footing, river channel, bank and a riprap placement plan are incidental to the work being performed and are not measured or paid separately.

CODE 938.1000
PRICE ADJUSTMENTS

DESCRIPTION:

The following base prices shall be used for Price Adjustment:

a. Liquid Asphalt Cement. The Base Price of Liquid Asphalt Cement as required to implement Subsection 938.03.1 of the Standard Specifications is $ 712.50 per ton as of June 29, 2026.

b. Diesel Fuel. The Base Price of Diesel Fuel as required to implement Subsection 938.03.2 of the Standard Specifications is $ 3.3513 per gallon as of June 29, 2026.

c. Steel. The Base Price of Steel as required to implement Subsection 938.03.3 of the Standard Specifications shall be the price posted as of the project award date. The steel base prices are posted at RIDOT PMP start page, Documents, “Price Adjustment” link.

CODE L06.9901
LIVE STAKES

The work under this item shall conform to the relevant sections of the Specifications and the following:

DESCRIPTION:
This work is the furnishing and planting of live stakes into installed embankment riprap for scour protection at the locations shown on the plans.

MATERIAL
According to subsection L06.03.3, the current edition of "American Standard for Nursery Stock" (ASNS), ANSI, Z60.1 of the American Nursery and Landscape Association (ANLA), and as follows:

Provide live stakes harvested locally, within the same physiographic ecoregion and plant hardiness zone. Live Stakes are composed of freshly cut, dormant branches, with side branches removed cleanly, 1/2 to 2 inches in diameter, 24 to 36 inches in length. Butt ends must be cut at a 30 to 45- degree angle for insertion into the soil. Tops must be cut square or blunt to allow for installation. At least 2 to 5 bud scars are required near the top to facilitate branch development. Collect live cuttings during the dormant period between November 1st and March 31st; live stakes provided and / or installed outside this period are not allowed. Where local conditions warrant, these dates may be extended, if directed by the Engineer. Do not store live stakes for more than 2 weeks after they have been prepared for installation.

CONSTRUCTION METHODS
As shown on the contract Drawings and as follows:

During transport, live stakes must be bundled and covered with a tarpaulin or wet burlap. Transport in unheated portions of a vehicle, and in a moist condition to prevent drying out and tree stress. When on site, protect from overheating, wind damage, and drying out by storing in a cool, moist, and shaded environment. Spray daily or submerse in cool water less than 60° F to prevent drying. Do not store for more than 2 weeks.

Delineate the plant locations and identify the plants to be placed at the delineated location. Do not start excavation or cultivation until the locations and outlines are accepted. Plant live stakes during dormancy period between November 1 and December 1 or March 31 and April 15.

Install live stakes into the proposed riprap embankments, outside of bridge superstructure footprint and above ordinary high water, as shown on the plans. Soak the bottom half of the live stake in cool water for a minimum of 24 hours before installation. Create a pilot hole ½ to 1 inch larger in diameter than the diameter of live stakes at a minimum depth of 2/3 of the total length of the live stake. Using a rubber mallet or a wooden tamping surface, install live stakes into the pilot holes with the square end upward and the pointed end downward at approximately a 90-degree angle to the embankment slope. Live stakes may be hammered directly into the riprap when allowed by the Engineer.

After installation, backfill riprap with placed excavated native riverbed material (from stockpile) and tamp to fill all voids. Firmly pack soil removing all gaps and pockets around the live stake. Repeat until all riprap surface are covered and form a graded embankment slope. Apply a 4" layer of plantable soil material evenly over the embankment and spread native seed mix over the plantable soil layer in accordance with Section L02.

Splits that occur during installation that extend beyond only one bud scar are acceptable. Splits that extend beyond two bud scars will be rejected. Remove and replace at no cost to the Department any rejected live stakes.

METHOD OF MEASUREMENT:

Live Stakes will be measured by the number of live stakes of the specified types and sizes installed.

BASIS OF PAYMENT:

The Department will pay for the completed and accepted quantities as follows:

Pay Item	Pay Unit
Live Stakes	EACH

The price shall constitute full compensation for all labor, materials, tools, equipment, and incidentals necessary to satisfactorily complete this work as described in these Special Provisions and elsewhere in the Contact Documents, complete in-place and accepted.

Excluded Items of Work:

- 202.9902 - STOCKPILING AND PLACEMENT OF RIVERBED MATERIAL
- 920.0330 - RIPRAP R-6, R-7, R-8 STANDARD 8.3.0
- L01.0104 - PLANTABLE SOIL 4 INCHES DEEP
- L02.0107 - SEEDING

CODE L06.9902 RHODO – ROSEBAY 2-2.5 FEET
CODE L06.9903 MAPLE – RED 2-2.5 INCH CALIPER

The work under this item shall conform to the relevant sections of the Specifications and the following:

DESCRIPTION.
This item shall consist of installing of tree and shrubs in accordance with the plans and Section L06 – Planting of the RIDOT Standard Specifications, February 2026.

MATERIALS.
Materials for this work shall conform to Section L06 – Planting of the RIDOT Standard Specifications for Road & Bridge Construction.

CONSTRUCTION METHODS.
The work associated with this item shall conform to Section L06 – Planting of the RIDOT Standard Specifications for Road & Bridge Construction.

METHOD OF MEASUREMENT.
Planting will be measured by the number of trees and shrubs of the specified types and sizes installed.

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

Pay Item	Pay Unit
L06.9902 Rhodo – Rosebay 2-2.5 feet	EA
L06.9903 Maple – Red 2-2.5 inch caliper	EA

The prices constitute full compensation for all labor, tools, materials and equipment, and all incidentals required to satisfactorily finish the work as described in this Special Provision and elsewhere in the Contract Documents, complete in place and accepted by the Engineer.