SPECIAL PROVISIONS

Acton, Massachusetts

ITEM 102.511 TREE PROTECTION – ARMORING & PRUNING EACH

The work under this item shall conform to the relevant provisions of Sections 771 and shall be for furnishing and installing temporary tree trunk protection and for minor limb pruning or removal of lower tree limbs to prevent injury to the tree from construction equipment and activities.

Trunk armoring is for instances where construction activity (the use of heavy equipment) comes close enough to potentially damage the tree trunk or limbs. It is to be used where shown on the plans and as directed by the Engineer.

References

If requested, the Contractor shall provide to the Engineer one copy of the latest edition of the American National Standards Institute (ANSI) A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance: Part 1-Pruning and Part 5-Construction Management Standard. Provision of reference shall be incidental to this item.

Materials

Trunk armoring shall be such that it prevents damage to the trunk from construction equipment. Selected material shall be such that installation and removal will not damage the trunk. Acceptable materials include 2x4 wood cladding with wire or metal strapping, or, for instances when duration of construction activities is less than three months, corrugated plastic pipe mounted with duct tape. Height of cladding shall be from base of tree (including root flare) to the bottom of the first branch or as recommended by the Arborist. Material and methods shall be approved by the Engineer.

Fencing to be installed at permitter of Tree Protection Zone at dripline of tree(s) and shall be constructed with chain link fencing and metal posts.

Other materials or methods may be acceptable if approved by the Town, Tree Warden or an Arborist.

Methods of Work

Prior to construction activities, the Engineer, the Contractor, the Town Tree Warden, and the Arborist, if specified, shall review trees noted on the plans to be protected. Final decision as to trees armored and/or pruned shall be per the Engineer.

Care shall be taken to avoid damage to the bark during installation and removal of armoring. Trunk armoring shall be replaced and maintained such that it is effective for as long as required

ITEM 102.511 (Continued)

and shall be removed immediately upon completion of work activities adjacent to trees.

Pruning of limbs shall conform to the techniques and standards of the most recent ANSI A300 standards.

Damages & Penalties

In the event that trees designated for protection under this item are damaged, including root damage from unapproved trespassing onto the root zone, the Contractor shall, at his own expense obtain an Arborist. The Arborist shall be approved by the Town.

If, based on the recommendations of the Arborist, the Engineer determines that damages can be remedied by corrective measures, such as repairing trunk or limb injury, soil compaction remediation, pruning, and/or watering, the damage will be repaired as soon as possible within the appropriate season for such work and according to industry standards.

If the Engineer determines that damages are irreparable, the Contractor shall pay for the damages in the amount of $500.00 per diameter inch at breast height (DBH) per tree.

Additionally, if the Engineer determines that the damages are such that the tree is sufficiently compromised as to pose a future safety hazard, the tree shall be removed. Tree removal will include clean up of all wood parts, grinding of the stump to a depth sufficient to plant a replacement tree or plant, removal of all chips from the stump site, and filling the resulting hole with topsoil.

Method of Measurement and Basis of Payment

Item 102.511 will be measured and paid at the contract unit price per each. This will include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

In the event of tree damage, cost of Arborist services, of remediation measures, and/or tree removal will be borne by the Contractor.

Payment under this item will be scheduled throughout the length of contract:

- 40% of value shall be paid upon installation of trunk armoring and completion of pruning work, if required.
- 60% shall be paid at the end of construction operations that would damage the tree and after protection materials have been removed and properly disposed of by the Contractor. In the event of repairable damages, payment shall be made after the completion of remediation measures. In the event of irreparable damage due to lack of proper protective measures being take there will be no compensation in addition to the $500.00 per diameter inch penalty.

ITEM 153. CONTROLLED DENSITY FILL - EXCAVATABLE CUBIC YARD

The work under this Item shall conform to the relevant provisions of Section 150 and the following:

Controlled density fill (CDF) shall be used as directed by the Resident Engineer to backfill excavations and trenches that are difficult to achieve adequate compaction. Controlled density fill shall conform to the requirements of Section M4.08.0. Controlled Density Fill Type 1E or 2E, as directed. CDF shall be used to backfill excavations and trenches within the proposed roadway.

CDF may be used for backfill for drainage utility trenches and for abandoning catch basins within the proposed roadway surface.

Steel plates required for temporary condtions during trench excavation shall be considered incidental to this item.

COMPENSATION

Method of Measurement

Controlled Density Fill shall be measured by the cubic yard of material placed within the specified limits as directed by the Resident Engineer.

Basis of Payment

Controlled Density Fill shall be paid for at the contract unit price per cubic yard of material and shall include all material, labor, equipment, and incidentals necessary to complete the work.

ITEM 201. CATCH BASIN EACH

This work shall consist of the construction of manholes, inlets, basins, and straight-walled basins in accordance with the specifications, and in close conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIALS

Concrete for these structures shall meet the requirements of Subsection 901: Cement Concrete. Other materials shall meet the requirements specified in the following Subsections of Division III, Materials

Clay Brick M4.05.2
Cement Concrete Blocks M4.05.1
Precast Drainage Structures M4.02.16
Cement Mortar.....M4.02.15
Reinforcing Bars.....M8.01.1
Iron Castings.....M8.03.0
Steel Castings..... M8.03.2
Dry Stone Masonry.....M9.04.9

CONSTRUCTION METHODS

General

Basins, straight-walled basins, manholes and inlets shall be built to the lines, grades, dimensions and design shown on the plans and as directed with the necessary frames, gratings, covers, hoods, etc., and in accordance with these specifications. Basins, straight-walled basins and inlet grates other than Cascade type may be Type A-1 or A-3, but only one type may be used throughout the project. Sanitary Sewer Manholes shall be constructed according to the specifications of the Municipality as designated in the Contract.

Excavation

Excavation shall conform to the applicable portions of Subsection 140: Excavation for Structures

Laying Bricks and Blocks

Brick and concrete blocks shall be soaked in water before laying. All joints in brick structures shall be thoroughly flushed full of mortar and no joint on the inside face shall be greater than ⅛ in. After Massachusetts Department of Transportation – Highway Division Standard Specifications for Highways and Bridges II.56 2021 Edition the bricks are laid, the joints shall be pointed on the outside. As brick walls are laid up, the outside of the structure shall be plastered with ½-in. thick mortar coat. As circular concrete block walls are laid-up the horizontal joints and keyways shall be flushed full with mortar. As rectangular blocks are laid up all horizontal and vertical joints shall be flushed full with mortar. Plastering of the outside of block structures will not be required. The joints in precast units shall be wetted and completely mortared immediately prior to settling a section. No structure shall be backfilled until all mortar has completely set. When the floors of structures are made of concrete sectional plates the opening in the floor shall be filled with brick chips and mortar, cement concrete, or left open, as directed.

ITEM 201. (Continued)

Placing Castings

Frame castings for basins, straight-walled basins, manholes and inlets shall be set in full mortar beds true to the lines and grades as directed. Where directed the castings shall be temporarily set at such grades as to provide drainage during the construction. The castings of structures located within the pavement area shall not be completely set to the established grade until the bottom course of pavement has been laid. The final setting of all other castings shall be performed at the proper stage of construction as directed. Cement concrete collars shall be placed around the castings after the final setting as shown on the plans and as directed. Hoods shall be installed in catch basins only when required by Special Provisions.

Weep Holes

Two weep holes shall be built into the walls of all new basins, straight-walled basins, precast units and in Types C, CF, D and DF drop inlets as shown on the plans. Each weep hole shall consist of a section of 4-in. pipe or equivalent opening to carry water through the wall of the structure. The ends of the pipe, if used, shall be saw cut and left flush with the walls of the structure. The outside end of the pipe or opening shall be covered with a ¼-in. mesh galvanized wire screen 23 gauge satisfactorily fastened against the wall. The drain to the weep hole shall be excavated and backfilled with 2 ft^3 crushed stone conforming to Section M2: Aggregates and Related Materials. The stone shall be placed against and over the end of the pipe or opening to prevent the entrance of the finer filling material. Only one type of weep hole shall be used throughout the project.

Backfilling

Backfilling requirements shall conform to the Provisions of 120.60: General, Paragraph B, 150.60: General, and 150.64: Backfilling for Structures and Pipes.

Method of Measurement

Measurement for catch basins, straight-walled catch basins, leaching basins, manholes and drop inlets (Types C and D), will be based on a standard unit having a depth of 6.5 ft; for drop inlets (Types A and B) having a depth of 4 ft-10 in., as measured vertically at the center of the structure from the top of the grating or cover to the top of the floor in the case of basins and inlets and the invert in the case of manholes. When the measured depth exceeds the standard unit, the number of units paid for will be in the proportion of the measured depth to the standard depth down to 9 ft. Basins, manholes, or drop inlets having a depth less than this standard unit will be counted as one unit. Each gutter inlet shall be counted as one unit. Measurement for manholes more than 9 ft down to a depth of 14 ft will be based on a standard unit depth of 9 ft as measured vertically at the center of the structure from the top of the cover to the invert. Measurement for manholes more than 14 ft down to a depth of 18 ft will be based on a standard unit depth of 14 ft as measured vertically at the center of the structure from the top of the cover to the invert. When items for Manholes (9 to 14 ft Depth) or Manholes (14 to 18 ft Depth) do not appear in the Proposal the standard unit of depth for all structures shall be 6.5 ft. Special manholes will be measured as complete units regardless of depth. Frames and grates or covers will be measured by each complete unit furnished and delivered to the site.

ITEM 201. (Continued)

Basis of Payment

The accepted quantities of manholes, inlets, basins, and straight-walled basins will be paid for at the contract unit price each, complete in place, which shall include crushed stone for weep holes and installation of the frame and grate or cover. Payment for the concrete collars shall be included in the contract unit price of the structure involved. Extra depth excavation below the proposed bottom of structure to obtain a stable foundation will be paid for as Class B Trench Excavation. When directed, the castings of drainage structures on roadways opened to traffic will be set to a temporary grade, and the unit will be considered complete in place and paid for at the contract unit price for the type of structure involved. At such time as the casting or structure and casting is adjusted to final grade the work shall be done and payment made under the provisions of Subsection 220: Adjustment, Rebuilding and Remodeling of Drainage Structures. If the material for backfill is obtained from borrow it will be paid for at the contract unit price per cubic yard or ton for the kind of borrow required. Frames and grates or covers will be paid for at the contract unit price each under the items for furnishing and delivering new frames and grates or covers. Hoods shall be paid at the contract unit price each and shall include furnishing and installation of the hood.

ITEM 271.12 12 INCH AND UNDER PIPE REMOVED AND STACKED FOOT

This work shall consist of removing 12-inch present pipes, plugging the ends and relaying or stacking them in accordance with these specifications and in close conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIALS

Material for Pipe Joints shall conform to the requirement of 230.40: General.

CONSTRUCTION METHODS

Removal of Pipe

A trench of sufficient width and depth shall be excavated so that the present 12-inch pipe can be removed without damage to the pipe. All joints shall then be opened and the 12-inch pipe removed in its original sectional lengths. Existing 12-inch pipe in good condition which is damaged in removing or other handling due to carelessness of the Contractor, shall be replaced with new pipe at the Contractor's expense.

Relaying

The construction methods for relaying the 12-inch pipe in its final location shall conform to the requirements of 230.60: General to 230.63: Structural Plate Pipe and Pipe-Arch inclusive. In the case of corrugated metal pipe culverts, the Contractor shall furnish and place new collars and bolts and repair the coating of the pipe as directed.

Masonary Plugs for Pipe Ends

Masonry plugs shall consist of bricks and mortar to form a watertight seal at the end of the 12 inch pipe being plugged. The thickness of the plug shall at least be equal to the inside diameter of the pipe being plugged.

Stacking

The Contractor shall accept and hold entire responsibility for the removal, handling, stacking at a location convenient for removal by the owner, and protection of all 12-inch pipe until its final removal by others as designated and in accordance with the following: Any 12-inch pipe lost or damaged through lack of protection or carelessness by the Contractor shall be replaced with satisfactory pipe at their expense. The Contractor's responsibility will cease upon final acceptance of the work or 60 days from the time a certified notice, with copy to Engineer, is sent by Contractor to owner of material that all material is available for removal.

Backfilling Trenches

The trench left by the removal of the 12-inch pipes shall be backfilled in conformance with the relevant provisions of 150.64: Backfilling for Structures and Pipes.

ITEM 271.12, (Continued)

COMPENSATION

Method of Measurement

12-inch pipes removed and relaid as directed will be measured in place after being relaid and quantity to be paid for shall be the length actually relaid. Any remaining pipe not required to be stacked shall become the property of the Contractor and shall be removed from the work without additional compensation. Masonry plugs for pipe ends shall be measured in place by the cross-sectional area of the inside of the pipe being plugged. 12-inch pipes removed and stacked, as directed, will be measured as the actual length of pipe removed and stacked in good condition. Trench excavation greater than a depth of 5 ft and rock excavation will be measured as specified in 148.80: Method of Measurement for Class B Trench Excavation and Class B Rock Excavation, respectively.

Basis of Payment

12- inch pipes removed and relaid will be paid for at the contract unit price per foot of the kind of pipe required to be removed and relaid, installed and complete in place. Masonry plugs will be paid for at the contract unit price per square yard complete in place. 12-inch pipes removed and stacked will be paid for at the contract unit price per foot of the kind of pipe required to be removed and stacked. Field Stone Masonry in Cement Mortar and 3,000 psi, 1.5-inch, 470 Cement Concrete will be paid for at the contract unit price per cubic yard. Trench excavation for both removing and relaying greater than a depth of 5 ft and rock excavation for relaying will be paid for as specified in 140.81: Basis of Payment for Class B Trench Excavation and Class B Rock Excavation. Backfill for trenches 5 ft or less in depth shall be included in the various items of pipe. Backfill for that part of a trench which is more than 5 ft in depth shall be included in the item for Class B Trench Excavation. If borrow material is used for backfilling, it will be paid for at the contract price per cubic yard of the kind of borrow required.

ITEM 504.	**GRANITE CURB TYPE VA4-STRAIGHT**	**FOOT**
ITEM 504.1	**GRANITE CURB TYPE VA4-CURVED**	**FOOT**
ITEM 509.	**GRANITE TRANSITION CURB FOR PEDESTRIAN CURB RAMPS - STRAIGHT**	**FOOT**
ITEM 509.1	**GRANITE TRANSITION CURB FOR PEDESTRIAN CURB RAMPS – CURVED**	**FOOT**
ITEM 509.3	**MOUNTABLE GRANITE CURB STRAIGHT**	**FOOT**
ITEM 509.4	**MOUNTABLE GRANITE CURB CURVED**	**FOOT**
ITEM 510.	**GRANITE EDGING TYPE SA**	**FOOT**
ITEM 510.1	**GRANITE EDGING TYPE SA (RADIUS 10 FEET OR LESS)**	**FOOT**

This item of work shall consist of furnishing and setting curb, curb inlets, curb corners and edging on a gravel foundation except for bridge curb which is set in full mortar bed and hot mix asphalt curb which is placed on a hot mix asphalt base, in accordance with these specifications and in close conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIALS

Materials shall conform to the requirements specified in the following Subsection of Division ill, Materials:

Granite Curb.....M9.04.1
Granite Curb Inlets.....M9.04.5
Granite Curb Corners M9.04.6
GraniteEdging.....M9.04.2
Mortar.....M4.02.15
Gravel.....M1.03.0, Type c
Anchors.....M8.01.0
Cement Concrete Precast Units.....M4.02.14
Joint Material
TarPaper.....M9.06.2
Preformed Expansion Joint Filler.....M9.14.0
Hot Mix Asphalt Curb, Types 1, 2 & 3.....M3.12.0
Cement Concrete.....M4.02.00
Liquid Concrete Penetrant/Sealer.....M9.15.0

CONSTRUCTION METHODS

Excavating Trench

The trench for the curb shall be excavated to a width of 18 in. The trench for mountable curb shall be excavated to a width of 24 in. The subgrade of the trench shall be a depth below the proposed finished grade of the curb equal to 6 in. plus the depth of the curbstone. Existing pavements shall be sawcut in accordance with the requirements of Subsection 482: Sawcutting as shown on the plans and as required by the Engineer

Preparing Foundation

The foundation for the curb shall consist of gravel spread upon the subgrade and after being thoroughly compacted by tamping shall be 6 in. in depth.

ITEM 504., 504.1, 509., 509.1, 509.3, 509.4, 510., 510.1 (Continued)

The gravel foundation for edging shall be as shown on the plans and shall be thoroughly rammed or tamped until firm and unyielding. The foundation for the curb inlet shall consist of a full bed of Portland cement mortar on the supporting back wall of the catch basin or gutter inlet and sufficient gravel on each side to support the overhang. The trench for the gravel foundation shall be at least 6 in. in depth and 18 in. in width. This trench shall be filled with gravel thoroughly tamped to the required grade. The trench for the curb corner shall be excavated so that there shall be constructed a foundation of gravel which when thoroughly compacted will be 6 inches in depth, and extending 6 in. beyond the front and back of curb corner to the full depth of foundation. Other acceptable material may be used for backing

Setting Curb and Edging

Curbing, curb corners or edging shall be set on additional gravel spread upon the foundation. All spaces under the curb, curb corners or edging shall be filled with gravel thoroughly compacted so that the curb, curb corners or edging will be completely supported throughout their length. The curb shall be set at the line and grade required as shown on the plans. Curb, curb corners or edging shall be fitted together as closely as possible except for VA5 curb which shall not fit closer to each other than ¼ in. If curb, curb corners, curb inlets or edging of different quarries is used on the same project, curbing of each particular quarry shall be segregated and set to give uniform appearance.

Concrete Curb, Corners, and Edging

General

The curb shall consist of concrete castings molded in place in sections 6 ft long, 24 in. in depth, 6 in. in width at the top, and 7 in. in width at the bottom and with front vertical face. The top front edge of curb shall be rounded to ¾-in. radius. The ends of curb sections shall be chamfered ¼ in. The edging shall consist of concrete castings conforming to the size and dimensions shown on plans. Straight edging shall be cast in lengths of 4 ft. Edging for curves with radii-300 ft or less shall be straight edging but shall be cast in lengths less than 4 ft in order to avoid angles at joints. The ends of all edging shall be normal to the line of face. The edges of edging face shall be chamfered ¼ in. Corners shall match the adjacent curb in size, color and finish. The front arris line shall extend through ¼ of a circle having a radius of 2 ft or 3 ft respectively for Type A or Type B curb comer. The back arris line shall be straight. The plan of the back shall be normal to the top. All forms shall be set true to lines and grades indicated on plans and as directed and held rigidly in proper position. They shall be either of metal or of acceptable planed and matched lumber of such construction that a smooth surface will be provided. Expansion joints shall be formed at the intervals shown on the plans using preformed expansion joint filler having a thickness of ½ in. When curb is constructed adjacent to or on concrete pavement, expansion joints hall be located opposite or at expansion joints in the pavement.

Mixing and Placing Concrete

The concrete shall be of such consistency and be so spaded and worked that a smooth mortar face will be produced

Protection, Curing and Finishing of Concrete

1. Protection. The forms shall be left in place for 24 hours or as directed until the concrete has set sufficiently so that they can be removed without injury to the castings. Particular care will be required to prevent any discoloration of the exposed surface.
2. Curing. When the concrete has hardened sufficiently the concrete shall be covered with acceptable burlap or other approved material and kept wet for 3 days or longer. Under extreme weather or other particular conditions proper curing shall be carried out as directed.
3. Finishing. The castings shall, immediately upon removal of the forms, be rubbed down to a smooth and uniform surface, but no plastering will be allowed. For this work a competent and skillful finisher shall be employed.
4. Protective Coating. The Concrete Penetrant/Sealer shall conform to the requirements of M9.15.0: Liquid Penetrant/Sealant. After the concrete is at least 14 days old and after a 48- hour minimum drying period (a longer period shall be required if castings do not appear dry) just prior to the time of treatment, the exposed surface shall be cleaned to remove all oil, grime and loose particles which would prevent the mixture from penetrating the concrete. immediately before the application of the mixture, an air blast shall be directed over the surface to be treated so that all dust will be removed. The temperature of the concrete and air shall be 50°F or higher at the time of application. For rate of application see M4.02.14: Precast Units, Paragraph D.

The second application of the surface treatment mixture shall not be made until the concrete, in the judgement of the Engineer, has regained its dry appearance. Traffic shall be prohibited from the area until the concrete has regained its dry appearance.

Hot Mix Asphalt Curb

The HMA mixture shall be placed and compacted with a machine acceptable and approved by the Engineer. The machine shall be capable of spreading the mixture true to line and grade and to the shape stipulated. The HMA curb shall be placed as shown in the current Department Standards. If at any time before the acceptance of the work any soft or imperfect spots develop in the exposed surface of the curb, such material placed shall be removed and replaced with new-material and compacted, without additional compensation.

Filling About Trench

After the curb, curb corners, curb inlets, and edging is set, the space between it and the wall of the trench shall be filled with gravel thoroughly tamped to the depth directed, care being taken not to affect the line or grade of the curb, curb corners, curb inlets and edging

Bridge Curb

On bridges, after the concrete base has set and before the concrete in back of the curb is placed, Type VA5 curb shall be set to line and grade in full mortar beds and full mortar end joints with the anchors in the stone grouted in place. Each curb shall be brushed clean and free from loose particles, and thoroughly wetted with clean, fresh water before setting. The stone shall be carefully bedded in a full bed of mortar and in such a way as not to slide the stone on the mortar bed. Each stone shall be held securely in position by 2 steel anchors. The anchors shall be of the required dimensions and shapes and shall extend 3 in. into the curb and 6 in. into the concrete. Care shall be taken in placing the concrete in back of the curb to avoid disturbing the line or grade of the

curb. Wherever plans indicate a construction joint in the sidewalk, or paraffin joint in coping, the curb shall be laid out so that a joint in the curb will be opposite the joint in the sidewalk, or coping.

Pointing

The joints between curbstones (both front and back) or edging shall be carefully filled with cement mortar and neatly pointed on the top and front exposed portions. After pointing, the curbstones or edging shall be satisfactorily cleaned of all excess mortar that may have been forced out of the joints.

Transition Curb for Pedestrian Curb Ramps

Transitions from normal curb settings to pedestrian curb ramps shall be accomplished with transition curb as directed. Transitions shall be of the same type curb and similar to that abutting and, if on a curve, of the same radius.

Sloped Edging to Vertical Curb Transition

Transitions from vertical curb settings to sloped granite curb shall be accomplished with transition curb as detailed on the engineering plans.The same method of setting setting vertical curb shall be used to set the sloped edging to vertical curb transition peices.

Mountable Curb - Straight and Curved

Mountable granite curb shall be used in conjunction with the mountable truck apron and shall be set in accordance with the detail as shown on the engineering plans.

COMPENSATION

Method of Measurement

The length of curb (except hot mix asphalt curb) and edging shall be as measured along the front arris of the curb and edging, except that where the edging is set on a curve having a radius of 10 ft or less, the measurement will be made along the edging at the lowest exposed level after completion of shoulder or pavement. The quantity of hot mix asphalt curb to be paid for will be the length actually measured along curb at its lowest exposed edge or by tonnage actually used, complete in place. Weight slips shall be countersigned upon delivery by the Engineer and slips not countersigned shall not be included for payment. Each curb corner and curb inlet set, complete in place, will be considered one unit

Basis of Payment

Curb or edging will be paid for at the contract unit price per foot, complete in place which shall include sawcuts made in existing pavement, cement concrete placed to set the curb or edging and all other work necessary to complete the installation. Curved granite curb shall include all curb (except curb corners), cut to specified radius and set on curve. The steel anchors used with Type VA5 curb will be paid for under the Item for VA5 curb. Where granite edging is set on a curve

having a radius of 10 ft or less the work will be paid for at the contract unit price per foot, complete in place, under the respective item for the particular type of edging required. Curb inlets will be paid for at the contract unit price each under the respective item for the particular type of inlet, either straight or curved, complete in place. All curb corners will be paid for at the contract unit price for each, under the item for the particular type of corner required, complete in place. The initial excavation, except Class A Rock Excavation, when done in conjunction with excavation for sub-base will be paid for under the appropriate excavation item. The price of the curbing will include compensation for any other required excavation. Gravel borrow for the foundations and backfilling will be paid for at the contract unit price per cubic yard under the item for Gravel Borrow. Rock excavation, if necessary, will be paid for at the contract unit price per cubic yard under the item for Class A Rock Excavation.

ITEM 590. CURB REMOVED AND STACKED FOOT
ITEM 592. CURB CORNER REMOVED AND STACKED EACH

This work shall consist of removing the present curb, edging, curb corners and curb inlets of every type and cross section made of granite, concrete or granite-faced and resetting or stacking them or discarding them in accordance with these specifications and in close conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIALS

Curb Edging, Curb Inlets and Curb Corners

Curb, edging, curb inlets and curb corners shall consist of so much of the same as is suitable, in the Engineer's judgment to be reset or stacked.

Gravel

Gravel shall conform to the requirements of M1.03.0: Gravel Borrow Type c

CONSTRUCTION METHODS

Removal

A trench of sufficient width and depth shall be excavated so that the present curb, edging, curb corners and curb inlets can be removed without damage. Existing pavements shall be sawcut in accordance with the requirements of Subsection 482: Sawcutting as shown on the plans and as required by the Engineer.

Protection

The Contractor shall protect all curb or edging and keep it in satisfactory condition until the acceptance of the entire contract. Particular care will be required to prevent any unsatisfactory discoloration of the curb or edging. The Contractor shall replace any existing curb, edging, curb corners and curb inlets that is to be reset, which is lost or damaged as a result of their operations, or because of their failure to store and protect it in a manner that would eliminate its loss or damage.

Adjustment

The length of any section of curb or edging, shall be altered by cutting in order to fit closures as necessary. The ends of all stones shall be square with the planes of the top and face so that when the stones are placed end-to-end as closely as possible no space shall show in the joint at the top and face of more than ¾ in. for the full width of the top and for 8 in. down on the face.

Relaying

The Construction methods for resetting all curbing or edging, in the final location shall conform to the requirements of 501.60: Excavating Trench to 501.62: Setting Curb and Edging, 501.65: Filling About Trench, and 501.67: Pointing.

ITEM 590., 592. (Continued)

Stacking

The Contractor shall accept and hold entire responsibility for the removal, handling, stacking at a location convenient for removal by owner, and protection of all curbing or edging until its final removal as designated in accordance with the following: Any curbing or edging damaged through lack of protection or carelessness by the Contractor shall be replaced at their expense. The Contractor's responsibility will cease upon final acceptance of the work or 60 days from the time a certified notice, with copy to the Engineer, is sent by Contractor to owner of material that all material is available for removal.

Discarding

Any curb, edging, curb corners and curb inlets not damaged through lack of protection or carelessness by the Contractor but deemed by the Engineer as unsatisfactory for relaying or stacking, will be discarded. It will be the Contractor's responsibility to dispose of any discarded curb, edging, curb corners and curb inlets without additional compensation.

COMPENSATION

Method of Measuement

The quantity of curb and edging to be paid for will be the length actually removed and reset, and measured as specified in 501.80: Method of Measurement. The quantity of curb or edging measured will be the length actually removed and stacked, and measured along the front arris line at the location stacked. The quantity of curb or edging removed and discarded will be the length ordered to be removed and actually removed, but not included for payment under the items of Removed and Reset or Removed and Stacked. Each curb inlet or curb corner removed and stacked or discarded will be considered as 1 unit. Any remaining curb or edging removed which is not included for payment under the items listed above shall be classified as Earth Excavation (See 120.21: Earth Excavation).

Basis of Payment

Removing and resetting curb and edging will be paid for at the contract unit price per foot at the new location complete in place, which shall include sawcuts made in existing pavement, cement concrete placed to set the curb or edging and all other work necessary to complete the installation. Removing and resetting curb inlets will be paid for at the contract unit price each for Curb Inlets Removed and Reset. Removing and resetting curb corners will be paid for at the contract unit price each Curb Corners Removed and Reset. Removing and stacking curb or edging will be paid for at the contract unit price per foot under the respective item. Removing and stacking of curb inlets and curb corners will be paid for under the items for Curb Inlets Removed and Stacked, and Curb Corners Removed and Stacked, respectively. Removing and discarding curb or edging will be paid for at the contract unit price per foot under the respective item. Removing and discarding of curb inlets and curb corners will be paid for under the items for Curb Inlets Removed and Discarded, and Curb Corners Removed and Discarded, respectively.

ITEM 697.1 SILT SACK EACH

Work under this item shall conform to the relevant provisions of Sections 227 and 670 of the Standard Specifications and the following:

The work under this item includes the furnishing, installation, maintenance and removal of a reusable fabric sack to be installed in drainage structures for the protection of wetlands and other resource areas and the prevention of silt and sediment from the construction site from entering the storm water collection system. Devices shall be ACF Environmental (800)-448-3636; Reed & Graham, Inc. Geosynthetics (888)-381-0800; The BMP Store (800)-644-9223; or approved equal. Submit catalog cut for the Engineer's approval prior to installation.

CONSTRUCTION METHODS

Silt sacks shall be installed in retained existing and proposed catch basins and drop inlets within the project limits and as required by the Resident Engineer.

The silt sack shall be as manufactured to fit the opening of the drainage structure under regular flow conditions, and shall be mounted under the grate. The insert shall be secured from the surface such that the grate can be removed without the insert discharging into the structure. The filter material shall be installed and maintained in accordance with the manufacturer's written literature and as directed by the Engineer.

Silt sacks shall remain in place until the placement of the pavement overlay or top course and the graded areas have become permanently stabilized by vegetative growth. All materials used for the filter fabric will become the property of the Contractor and shall be removed from the site.

The Contractor shall inspect the condition of silt sacks after each rainstorm and during major rain events. Silt sacks shall be cleaned periodically to remove and disposed of accumulated debris as required. Silt sacks, which become damaged during construction operations, shall be repaired or replaced immediately at no additional cost to the Department.

When emptying the silt sack, the contractor shall take all due care to prevent sediment from entering the structure. Any silt or other debris found in the drainage system at the end of construction shall be removed at the Contractors expense. The silt and sediment from the silt sack shall be legally disposed of offsite. Under no condition shall silt and sediment from the insert be deposited on site and used in construction

All curb openings shall be blocked to prevent stormwater from bypassing the device.

All debris accumulated in silt sacks shall be handled and disposed of as specified in Section 227 of the Standard Specifications

COMPENSATION

Silt sacks will be measured and paid at the Contract unit price per each, complete in place, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for removal and disposal of the sediment from the insert, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 706.12 JUMBO GRANITE COBBLES SQUARE YARD

These specifications cover the construction of a Jumbo Granite Cobble pavement. The work shall consist of furnishing and setting jumbo granite cobble pavement on a stone dust setting bed on a gravel base course in accordance with these specifications and in close conformity of the lines and grades shown on the Plans.

MATERIALS

Materials shall meet the requirements specified in the following descriptions and/or subsections of Division III of the Massachusetts Standard Specifications for Bridges and Highways.
Materials:
Sand Borrow……M1.04.0 Type A
Portland Cement…… ..M4.01.0
Gravel Borrow……M1.03.0 Type B

Stone Dust. Stone dust shall conform to the following gradation requirements:

Passing Sieve Size	**Percentage Passing**
No. 4	100
No. 50	90
No. 200	65

Jumbo Granite Cobbles. Jumbo Granite Cobbles shall be granite, basically light grey in color, free from seams and other structural imperfections or flaws which would impair its structural integrity, and of a smooth splitting appearance. Natural color variations characteristic of the deposit from which the jumbo granite cobbles are obtained will be permitted. Cobbles shall be rectangular in shape with one good face and shall have uniform dimensions with the following limitations:

	Minimum	Maximum
Length	10“	15“
Width	4“	6”
Depth	7”	8”

ITEM 706.12. (Continued)

CONSTRUCTION METHODS

The jumbo granite cobbles shall be laid on a 2 inch sand or stone dust bedding surface.

The base below the sand or stone dust setting bed shall be 6 inches of cement concrete over a subbase of 8 inches of compated gravel base.

The top surface shall be approximately 4 inches by 7 inches. The joints between the jumbo granite cobbles shall hand tight.

The jumbo granite cobbles shall be compacted and tamped by a method approved by the Engineer. The pavement surface shall be tested with a 10-foot straight edge and laid parallel with the centerline and any variations exceeding 1/4 inch shall be reset to proper grade.

The jumbo granite cobbles shall be swept with a sand/cement mixture (three parts sand, one part cement) and fogged with water. The pavement surface shall be vibrated to insure compactions between the joints. Additional joint filler of the sand/cement mixture shall be uniformly distributed as necessary to fill all of the voids. The process shall be repeated for a maximum of five (5) days until all joints are full.

Method of Measurement

Jumbo Granite Cobbles will be measured for payment by square yard.

Basis of Payment

Jumbo Granite Cobbles shall be paid for at the contract unit price per square yard of cobbles and shall include all material, labor, equipment, and incidentals necessary to complete the work.

ITEM 706.13 STAMPED CROSSWALK SQUARE YARD

Construct Stamped Concrete Pavement Surfaces as shown on the plans and in accordance with the following specifications:

Work under this item includes construction of crosswalks using integral concrete pavement color, pattern, textural surface, dry-shake color hardener, test slabs, and application of a sealant solution.

Work under this item also includes furnishing and installing joints in accordance with the plans and this specification.

Concrete must have a minimum 28-day compressive strength of 4500 psi concrete for cement concrete stamped crosswalk, with a maximum aggregate size of ½". The cement must be from the same mill, raw material type, and brand for all the stamped concrete and test slabs in order to make colors uniform.

Patterns

Pattern to be per construction documents or as directed by the Engineer.

Colors

- Color to be as directed by the Engineer.
- Color Admixture: shall contain colored, water-reducing, coloring agents that are lime proof and UV resistant, and without calcium chloride. The color admixture shall conform to the requirements of ASTM C979 and ASTM C494.
- Curing and Sealing Compound: Curing and sealing compound shall conform to the requirements of ASTM C309 and matching the color admixture manufacturer, for use with integrally colored concrete.
- Release Agent: pattern tool manufacturer recommended and compatible with integral color additives.
- Dry-shake Colored Hardener: As recommended by the pattern tool manufacturer and of a heavy duty grade.

Preformed expansion joint filler shall conform with Article M.03.01 Part 5.(b).(1).

Joint Sealant

Silicone joint sealants expressly manufactured for use with concrete will be considered for use provided they are submitted in advance for approval to the Engineer. Other joint sealants will be considered for use only if a complete product description is submitted, as well as documentation describing at least five installations of the product. These documented installations must demonstrate that the product has performed successfully for at least three years under traffic conditions.

ITEM 706.13. (Continued)

Backer Rod

An open-cell type rod with an impervious skin that will not outgas when ruptured. Use the backer rod together with the joint sealant.

Submit a Materials Certificate for the above joint sealant conforming to Article 1.06.07.

CONSTRUCTION METHODS

The stamped concrete shall have a uniform and consistent color and pattern. Stamp patterns with respect to the joints to insure the stones in the pattern line up with the joint locations. Special procedures or stamping equipment is required to construct the pattern on curves or irregularly shaped areas. Follow all manufacturers' recommendations unless otherwise directed by the Engineer.

Schedule the concrete placement to avoid exposure to excessive wind and heat before applying curing materials. In the event of forecasted rain, snow, or frost within a 24 hour period of time, protect concrete from moisture, freezing, or thawing.

A Pre-Placement meeting shall be held one week prior to concrete placement to discuss the project and application methods. It is strongly suggested that the Engineer, General Contractor, Subcontractor, concrete representative, and a manufacturer's representative are all present at the meeting.

Warranty:

For a minimum of 3 years but no more than 5 years post construction, The Contractor shall furnish and repair any defects of the stamped concrete. Defects include a stamped concrete surface showing pockets of varying color concrete degradation as a result poor workmanship or poor material. Poor workmanship or material consists of any of the following characteristics; a concrete mix with water or air content outside manufacturer's specifications, 28-day minimum compressive strength less than 4500 psi, aggregate larger than ½", a concrete slump exceeding 5 inches, or excessive permeability. The Contractor shall furnish and repair all damaged sections resulting from poor workmanship or material, as directed by the Engineer, and at no cost to the State.

Method of Measurement
Stamped concrete will be measured for payment by square yard.

Reinforcing will be paid separately. No separate payment will be made for joint sealer or filler.

Basis of Payment
Stamped crosswalk shall be paid for at the contract unit price per square yard of stamped crosswalk and shall include all material, labor, equipment, and incidentals necessary to complete the work.

ITEM 706.14 RE-LAY EXISTING COBBLES SQUARE YARD

These specifications cover the re-laying of existing cobble pavement. The work shall consist of furnishing and resetting existing cobble pavement on a stone dust setting bed on reinforced concrete base with a gravel subbase course in accordance with these specifications and in close conformity of the lines and grades shown on the Plans.

MATERIALS

Materials shall meet the requirements specified in the following descriptions and/or subsections of Division III of the Massachusetts Standard Specifications for Bridges and Highways.

Materials:

Sand Borrow……M1.04.0 Type A
Portland Cement……..M4.01.0
Gravel Borrow…….M1.03.0 Type B

Stone Dust. Stone dust shall conform to the following gradation requirements:

Passing Sieve Size	**Percentage Passing**
No. 4	100
No. 50	90
No. 200	65

CONSTRUCTION METHODS

The subbase below the stone dust setting bed shall be fine graded and thoroughly compacted (as required under Section 401 of the MSSBH).

The existing cobbles will be set with the smooth side up. The top surface shall be approximately 4 inches by 7 inches. The joints between the cobbles shall be set as shown on the construction documents.

The granite cobbles shall be compacted and tamped by a method approved by the Engineer. The pavement surface shall be tested with a 10-foot straight edge and laid parallel with the centerline and any variations exceeding 1/4 inch shall be reset to proper grade.

The re-layed granite cobbles shall be swept with a sand/cement mixture (three parts sand, one part cement) and fogged with water. The pavement surface shall be vibrated to insure compactions between the joints. Additional joint filler of the sand/cement mixture shall be uniformly distributed as necessary to fill all of the voids. The process shall be repeated for a maximum of five (5) days until all joints are full.

ITEM 706.14. (Continued)

Method of Measurement

Re-laying existing cobbles will be measured for payment by square yard.

Basis of Payment

Re-laying existing cobbles shall be paid for at the contract unit price per square yard of cobbles re-layed and shall include all material, labor, equipment, and incidentals necessary to complete the work.

ITEM 756. NPDES STORMWATER POLLUTION PREVENTION PLAN LUMP SUM

GENERAL

This Item addresses the preparation and implementation of a Storm Water Pollution Prevention Plan required by the National Pollutant Discharge Elimination System (NPDES) and applicable Construction General Permit.

Pursuant to the Federal Clean Water Act, construction activities which disturb one acre or more are required to apply to the U.S. Environmental Protection Agency (EPA) for coverage under the NPDES General Permit for Storm Water Discharges From Construction Activities. On February 16, 2012 (77 FR 12286), EPA issued the final NPDES Construction General Permit (CGP) for construction activity. The 2012 CGP replaces the 2008 CGP (which expired on February 15, 2012), and will provide coverage for eligible new and existing construction projects for a period of five years.

The NPDES CGP requires the submission of a Notice of Intent (NOI) to the U.S. EPA prior to the start of construction (defined as any activity which disturbs land, including clearing and grubbing). There is a fourteen (14) day review period commencing from the date on which EPA enters the Notice into their database. The Contractor is advised that, based on the review of the NOI, EPA may require additional information, including but not limited to, the submission of the Storm Water Pollution Prevention Plan for review. Work may not commence on the project until final authorization has been granted by EPA. Any additional time required by EPA for review of submittals will not constitute a basis for claim of delay.

In addition, if the project discharges to an Outstanding Resource Water, vernal pool, or is within a coastal ACEC as identified by the Massachusetts Department of Environmental Protection (DEP), a separate notification to DEP is required. DEP may also require submission of the Storm Water Pollution Prevention Plan for review and approval. Filing fees associated with the notification to DEP and, if required, the SWPPP filing to DEP shall be paid by the Contractor.

The General Permit also requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the afore-mentioned statutes and regulations. The Plan will include the General Permit conditions and detailed descriptions of controls of erosion and sedimentation to be implemented during construction. It is the responsibility of the Contractor to prepare the SWPPP to meet the requirements of the most recently issued CGP. The Contractor shall submit the Plan to the Engineer for approval at least four weeks prior to any site activities. It is the responsibility of the Contractor to be familiar with the General Permit conditions and the conditions of any state Wetlands Protection Act Order, Water Quality Certification, Corps of Engineers Section 404 Permit and other environmental permits applicable to this project and to include in the Stormwater Pollution Prevention Plan the methods and means necessary to comply with applicable conditions of said permits (reference to Part 9.1.1 of the 2012 CGP).

ITEM 756. (Continued)

It is the responsibility of the Contractor to complete the SWPPP in accordance with the EPA Construction General Permit, provide all information required, and obtain any and all certifications as required by the Construction General Permit. Any amendments to the SWPPP required by site conditions, schedule changes, revised work, construction methodologies, and the like are the responsibility of the Contractor. Amendments will require the approval of the Engineer prior to implementation.

Included in the General Permit conditions is the requirement for inspection of all erosion controls and site conditions on a weekly basis as well as after each incidence of rainfall exceeding 0.25 inches in twenty-four hours. For multi-day storms, EPA requires that an inspection must be performed during or after the first day of the event and after the end of the event. The Contractor shall choose a qualified individual who will be on-site during construction to perform these inspections. The Engineer must approve the contractor's inspector. In addition, if the Engineer determines at any time that the inspector's performance is inadequate, the Contractor shall provide an alternate inspector. Written weekly inspection forms, storm event inspection forms, and Monthly Summary Reports must be completed and provided to the Engineer. Monthly Summary Reports must include a summary of construction activities undertaken during the reporting period, general site conditions, erosion control maintenance and corrective actions taken, the anticipated schedule of construction activities for the next reporting period, any SWPPP amendments, and representative photographs.

The Contractor is responsible for preparation of the Plan, all SWPPP certifications, inspections, reports and any and all corrective actions necessary to comply with the provisions of the General Permit. Work associated with performance of inspections is not included under this Item. The Standard Specifications require adequate erosion control for the duration of the Contract. This Item addresses acceptable completion of the SWPPP, any revisions/amendments required during construction, and preparation of monthly reports. In addition, any erosion controls beyond those specified in bid items elsewhere in this contract which are selected by the Contractor to facilitate and/or address the Contractor's schedule, methods and prosecution of the work shall be considered incidental to this item.

The CGP requires the submission of a Notice of Termination (NOT) from all operators when final stabilization has been achieved, as well as removal and proper disposal of all construction materials, waste and waste handling devices, removal of all equipment and construction vehicles, removal of all temporary stormwater controls, etc. . Approval of final stabilization by the Engineer and confirmation of submission of the NOT will be required prior to submission of the Resident Engineer's Final Estimate. The permittee is required to use EPA's electronic NOI system or "eNOI system" to prepare and submit NOT. The electronic NOT form can be found at www.epa.gov/npdes/stormwater/cgpenoi. If you are given approval by the EPA Regional Office to use a paper NOT, you must complete the form in Appendix K of the 2012 CGP.

ITEM 756. (Continued)

BASIS OF PAYMENT

Payment for all work detailed above including, but not limited to, SWPPP preparation, required SWPPP amendments (including revisions/addenda pre, during and post- construction), NOI and NOT submissions, certifications, DEP filing fee (if required), inspections, preparation of weekly, monthly, and other required reports, distribution of copies, and all other requirements as described in this special provision are included in the Lump Sum price for this Item. Upon final acceptance of the SWPPP by the Department, a payment equal to 50% of the Contract Lump Sum price shall be paid. The remaining 50% of the Lump Sum shall be paid in 10% increments distributed equally throughout the remaining period of the Contract, not including extensions of time.

ITEM 821.12 HIGHWAY LIGHTING POLE (ANCHOR BASE) EACH
8 FOOT BRACKET

GENERAL

This work shall consist of furnishing and installing or modifying highway lighting. Included in the work is the furnishing and installing or modifying electrical conduit, electric manholes, handholes, pull or junction boxes, concrete foundations, wire and cable, equipment grounding, ground rods, service connection, lighting poles or towers, luminaires, control equipment, load center assemblies, photoelectric control switches, contactors, time clocks, and all incidental materials necessary for operating and controlling highway lighting systems as indicated on the plans. All systems and/or components shall be complete in every respect, fully wired, thoroughly tested, and ready for use.

The locations of highway lighting equipment shown on the plan are approximate and the exact locations will be established by the Engineer in the field with the exception of Lighting Poles or Towers. Their locations may be altered 10 ft (±) only by written permission from the Engineer, if obstructions are encountered during installation.

All electrical equipment shall be designed. manufactured and tested in accordance with the applicable standards of the ANSI, IMSA, ITE, NEMA and UL and these specifications.

Unless otherwise designated on the plans, on the Standard Drawings for Highway Lighting, as set forth in the Special Provisions, and as specified herein, all work and materials shall conform to the requirements of the NEC as amended by the MEC, herein referred to as the electrical code.

Wherever reference is made to codes or standards mentioned above, the reference shall be construed to mean the code or standard that is in effect on the date of advertising of the project.

All electrical connections, splicing, grounding, resistance tests, service connections and circuit identification shall be done by a licensed electrician holding “Certificate B” issued by the State Examiners of Electricians.

Standard symbols and construction derails for highway lighting installations are shown on the current Traffic Signal and Highway Lighting Standard Drawings.

Within 30 days following execution of the Contract, the Contractor shall submit to the Engineer for approval, a list of equipment which they propose to install. The submission shall include all equipment identified on the plans or in the specifications by the name of the manufacturer, model or identifying number of each item. The list shall be supplemented by catalog cuts and such other data as may be required, including wiring diagrams of any special equipment and of any proposed minor deviation from the plans. All of the above data shall be submitted in triplicate for checking. Following checking, correction and review, not less than 5 complete approved sets shall be resubmitted to the Engineer for distribution. The Town shall not be liable for any material purchased, labor performed, or delay to the work prior to such review and approval.

The warranties that the Contractor receives from each manufacturer of equipment and materials pertinent to the complete and satisfactory operation of highway lighting installation shall be turned over to the Town at the time of acceptance of the project, at no cost to the Town. Each

ITEM 821.12 (Continued)
warranty so furnished shall indicate its expiration date and be in effect for a minimum period of one year from the date the highway lighting was placed in continuous operation.

The contractor shall replace at their own expense any part of the lighting equipment found to be defective in workmanship, material or manner of functioning within six months from the date of final acceptance of all the installations.

If within one year from the date the highway lighting system is placed on continuous operation the equipment and materials do not meet the warrants specified above and the Engineer notifies the manufacturer or their authorized representative promptly, the manufacturer or their authorized representative thereupon shall correct any defect either by repairing or replacing any defective part or parts. at no cost to the Town.

It is the intent of the Plans, Specifications and Special Provisions to provide a complete highway lighting system through the project.

It is not intended that every fitting, minor detail or feature be shown and described, as the assumption is made that either the Prime Contractor or their Subcontractor is an expert in the particular area of responsibility and is capable of interpreting the Plans, Specifications and Special Provisions so that the bid shall include all items required and that they shall be provided and installed in a neat and workmanlike manner.

820.21: Definitions

A. Highway Lighting Poles.
An aluminum or galvanized steel structure providing up to a 50-ft mounting height for luminaires mounted on arms up to 10 ft long.

B. High Mast Tower.
A steel structure providing a mounting height greater than 50 ft for luminaires and equipped with a lowering device to permit luminaire maintenance at ground level.

C. Load Center Assemblies.
The term, as used herein, shall constitute assemblage of parts. Equipment and miscellaneous items. forming a complete and independent load center and circuit protector system, housed in a weatherproof trunk cabinet or building as specified.

D. Luminaires.
Shall consist of a housing, reflector, refractor or door glass, refractor holder or door glass holder, lamp socket, mounting device, ballast components, photoelectric control when specified and light source.

MATERIALS

820.40: General
All materials shall be new. Luminaires shall incorporate the latest photometric and design standards of IES, NEMA and UL.

ITEM 821.12 (Continued)
Where existing systems are to be modified. the existing equipment and material shall be incorporated in the revised system, salvaged, or abandoned, as directed.

All equipment and materials shall meet the requirements specified in applicable provisions of Section 800: Traffic Control Devices.

All metal support structures shall be in accordance with the requirements of Subsection 960: Structural Steel and Miscellaneous Metal Products.

Design and Equipment Requirements
The complete structures with all luminaires and appurtenances attached thereto shall be designed and constructed in accordance with the requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals for the following AASHTO criteria: 1) Fatigue Category No. 1, 2) Design Wind Speed 130 MPH and 3) 50 Year Design Life.

Where aluminum alloy parts are fastened to steel or other dissimilar materials, the aluminum shall be kept from direct contact with the steel or other dissimilar materials by methods approved by the Engineer.

A. Highway Lighting Poles.
1. Poles from 30 to 50 ft shall be made of aluminum or galvanized steel. Galvanizing shall meet the requirements of Section M7: Paints, Protective Coatings. Aluminum poles over 40 ft may be in two sections telescoped together and lapped not less than two times the pole diameter at the lapped-joint. Aluminum poles shall be produced from continuous extruded tube and shall not be sleeved in the base portion to compensate for thinner walled tubing. Each pole shall be designed and fabricated in a manner that will accommodate a single or double arm 10 ft in length.

2. Arms shall be designed for 2-in. slip fitter mounted with 75-lb luminaires that have a projected area of 3.3 ft^2.

3. Poles shall have a handhole with a reinforced frame and cover. The opening shall be approximately 4 in. x 6 in. located approximately 12 in. from the bottom of the pole and placed 90° to the arms. Pole cap shall be the same material as the pole, watertight and held securely in place on the pole by a set screw or screws or stamped cap.

4. Bonding and grounding shall be provided that will ensure an effective path for fault current that facilitates the operation of an overcurrent protection device.

5. Anchor bolts nuts, bolts, and washers shall conform to M8.01.5: Anchor Bolts, Nuts and Washers and the Standard Drawings.

6. The arms shall be furnished with a finish similar to that of the pole. The exterior of the pole and arm shall be free of protuberances, dents, cracks, discolorations and other imperfections marring their appearance.

7. For shipping purposes, the pole and arm shall be protected to preserve the finish.

ITEM 821.12 (Continued)

8. The dead load deflection at the top of the pole caused by the mass of the arm, luminaires and all appurtenances attached thereto shall not exceed 2% of the pole length.

9. Aluminum poles shall have a Combined Stress Ratio (CSR) no greater than 0.95. Aluminum poles over 20 ft in length shall have internal dampers installed to reduce vibrations.

10. An identifying tag shall be affixed to the pole at a readable location on the side of the pole away from traffic.

11. Information on the tag shall include, manufacturer's name and order number, date of manufacture and pole material.

B. High Mast Towers.

All high mast towers shall be made of galvanized steel.

Anchorage shall consist of four or more high strength steel bolts, having two heavy duty hex nuts, and fabricated from high strength low alloy steel having a minimum yield of 50 ksi positioned and designed to withstand the forces corresponding to the moment which will cause failure to the shaft. Anchor bolts shall be furnished with a template and a prefabricated reinforcing cage welded to the bolts.

C. Highway Luminaires.

The luminaire shall be of the horizontal burning gaseous discharge lamp type with IES Type II, III or IV lateral light distribution, as indicated on the plans, with medium vertical light distribution and semi-cutoff vertical light control.

The luminaire shall have a precision-case aluminum housing providing for slipfitter end mounting capable of adapting to 1.25-in. or 2-in. mounting brackets with provisions for vertical adjustments of not less than 3°. The reflector shall be of detachable snap-in design, manufactured of polished aluminum. The refractor shall be mounted in a door frame assembly and hinged with a safety catch to the luminaire at the house side and fastened at the street side by an automatic type latch. The refractor and door frame assembly shall be forced upward at the street side by spring pressure when latched against the gasket seat. Gaskets between the reflector and the refractor and the socket entry shall be made of a material capable of withstanding the temperatures involved and be held securely in place. Refractor shall be heat resisting glass with inner or outer prisms.

When stipulated, luminaires shall be furnished and installed with glare shields.

Luminaires shall have an internal ballast of the regulator type capable of operating from multiple circuit voltages indicated on the plans, at a power factor of not less than 95% . The ballast shall be pre-wired to the lamp socket and terminal board, requiring only connection of the power supply leads to the ballast primary terminals. The ballast shall provide regulation within 4% (8% for 1,000-watt units) variation in center rated lamp watts with a ±13% variation in primary volts from the ballast voltage-design center. Ballast shall provide satisfactory lamp starting to -20°F, minimum over the recommended line voltage variation. Ballast and capacitor components shall be arranged so that their operating temperature is not exceeded.

The luminaire shall include a photoelectric control device, as specified in Paragraph I, and locking type mounting receptacle in accordance with NEMA standards. The receptacle shall be pre-wired to the terminal board.

ITEM 821.12 (Continued)

Lamps shall be of the gaseous discharge type and wattages indicated. They shall conform to ANSI (ASA) requirements as listed in reputable lamp manufacturers catalogues. Lamps failing during first 1,000 hours shall be considered defective and be replaced at no cost to the Town.

I. Photo Electric Control.

The controls shall be twist-lock plug-in devices to be used with highway lighting equipment conforming to NEMA standards. They shall be of the tubeless type rated for 50 or 60 Hz, alternating current, at the following voltages and load capacity with inrush current rating not less than 100 A:

1. 105-285V, 18,000 volt-amperes
2. 120V, 1,800 volt-amperes
3. 208V, 1,800 volt-amperes
4. 240V, 1,800 volt-amperes
5. 277V, 1,800 volt-amperes
6. 480V, 1,800 volt-amperes

Controls shall have a tum-on range of 0.5 fc to 2.5 fc and shall be factory adjusted to tum on at 1 fc.

The tum off level shall be between 1 fc and 2 fc higher than turn on levels. It shall be possible, by means of simple hand tools or by a calibrated adjustment knob, to adjust the tum on time of the lights when the north sky illumination falls within the range of values specified herein.

Normal operation of the photo electric control shall not be affected by line voltage variations of ±10%. Minimum operating temperature range shall be from -20°F to +150°F. The unit shall have a built-in surge protective device for protection from induced high voltage and follow through currents.

A time delay feature shall be incorporated as a pan of the control circuit to prevent false turn-offs by transient light. The controlled lighting load shall remain on or become energized in the event of any functional failure of the photo electric control circuit.

J. Multiple Control Switch.

The switch shall be equipped for either pole or wall mounting with all components (relays. etc.) housed in a weatherproof enclosure and designed for controlling loads up to 6,000 watts. The switch shall be pre-wired complete with NEMA twist-lock receptacle for an integrally mounted photoelectric control, as specified in Paragraph I or controlled remotely by a switch. Photo electric control voltage must match multiple control switch voltage.

K. Multiple Circuit Contactor.

The contactor shall be an unenclosed single phase, two-pole open type magnetic contactor of the rating indicated. Contactors shall be constructed for surface mounting on a false back. The contactor coil shall be remotely operated by a multiple control switch as specified in Paragraph J and a photo electric control as specified in Paragraph I or controlled remotely by a switch as specified in Paragraph L, or controlled remotely by a time clock as specified in Paragraph M. as shown on the plans or specified in the Special Provisions.

L. Remote or Test Switch.

A heavy duty, single-pole tumbler switch rated at 20 amperes, encased in a heavy-duty metal

weatherproof housing, shall be installed in the control cabinet or lighting pole bases as a highway lighting test switch. The switch shall be rated for operation on the voltage specified for the device it controls. The switch shall be wired so as to shunt the photo electric control, multiple control switch, multiple circuit contactor or time clock and energize the lighting circuits.

M. Astronomic Time Clock.
Astronomic time switches shall be 35 A, double pole, single throw, heavy duty, 42°30' North Latitude, astronomic dial street light type with high torque synchronous motor and 10-hour main spring operation to provide accurate timing during power interruptions. When power is restored after any failure, the motor shall resume timing and automatically wind the main spring.
The motor shall be designed to operate on 120/240VAC 60 Hz at temperature ranging from -20°F to +150°F. The time clock shall have a wall mounted pressed steel case with rain-tight gasketed door cover and mounted in the load center housing.

N. Service Riser Pipe.
Galvanized steel conduit shall meet the requirements of M5.07.1: Electrical Conduit-Rigid Metallic (Type RM).

O. Secondary Conductors.
Secondary conductors shall conform to the requirements of 813.63: Service Connections.

P. Service Cabinet or Housing.
The housing for load center assemblies shall be a trunk type cabinet as specified in Subsection 815: Traffic Control Signals for vehicle-actuated traffic signal controllers, and of a size to house all equipment. The cabinet shall be the product of a Manufacturer with an established reputation who has designed and produced similar cabinets.

Q. Circuit Protection.
The Contractor shall furnish and install on the rear wall of the trunk type cabinet a power distribution panel. A main bus shall be provided, protected by a main and branch circuit breakers. All equipment shall be designed for the amperage, voltage and phase designated. The general arrangement of circuit breakers shall be in accordance with the circuit diagram shown on the plans. Circuit breakers shall be unenclosed molded case bolt-on type with end conductor terminals, suitable for surface mounting on a metal false back. The Contractor shall provide a chart mounted on the cabinet door identifying circuit breakers and the circuits they control. Circuit breakers shall be of the rating shown on the plans.

R. Load Center Concrete Foundation.
The Contractor shall construct the service cabinet foundation of reinforced cement concrete as shown on the standard drawings on a 12-in. gravel sub-base.

S. Meter Socket.
A 200-ampere meter socket approved by the serving utility shall be furnished and installed on the service cabinet or where directed by the serving utility.

CONSTRUCTION METHODS

Details of construction shall conform to all applicable provisions of Sections listed 820.40: General

ITEM 821.12 (Continued)
and the specifications set forth hereinafter.

Highway lighting poles, area lighting poles and high mast towers shall be handled in loading, unloading and erecting in such a manner that they will not be damaged. Any parts that are damaged due to the Contractor's operations shall be repaired or replaced at the Contractor's expense. Poles or towers shall not be erected on concrete foundations until the concrete has set for at least 28 days.

All surfaces of aluminum bases in contact with cement concrete shall be field coated with an aluminum impregnated caulking compound recommended by the manufacturer of the base. Poles and towers shall be raked sufficiently to be plumb after all loads have been placed, poles shall be raked by adjusting the 2 nuts supplied with each anchor bolt. The mounting height shall be measured from the light source to the roadway surface directly below. The bracket arm shall be securely attached to the shaft and the pole erected with the bracket and perpendicular to the center line of the roadway.

The Contractor shall mark on each light pole or tower, 6 ft above the roadway suitable numbers and letters two 2 in. minimum height displaying the pole number and circuit to which it is connected.

The luminaires shall be installed on the brackets specified, parallel to the road surface or aimed as indicated on the plans, securely fastened, lamped, connected, cleaned and ready for operation.

The service riser, the service cabinet, and the concrete mat shall be installed as shown on the plans and as required by the Code. The work under this item shall include all conduit to 4 ft beyond the load center. The service cabinet shall be installed on the concrete mat, complete with distribution panel mounted inside. The electrical components shall be mounted with machine screws and wired as shown on the plans or as directed. All conduits in the service cabinet shall be bonded together and grounded to the cabinet with not less than #8 AWG bare copper conductors. A ¾-in. x 12-ft long ground rod shall be driven in accordance with 813.62: Grounding Electrodes and stubbed 6 in. above the concrete foundation. Not less than a #2 AWG bare copper grounding conductor from the neutral bus shall be run continuously to the ground rod.

Photoelectric control devices shall be mounted with the light sensitive unit facing toward the north sky. Method of mounting shall be as indicated or as specified in 820.41: Design and Equipment Requirements, Paragraph I. Control switch contactors and time clocks shall be mounted as specified herein before.

Test switches shall be mounted as specified. When mounted in lighting pole base it shall be supported on an “L” shape galvanized steel bracket secured by anchor bolt and nut.

Tests Required Before Acceptance
The Contractor will be required to test the entire system for continuity, grounds, resistance to ground, insulation resistance, and make provisions for high voltage dielectric strength tests, before any equipment is connected. This shall be done by means of a 500V megohm-meter test which will indicate the insulation of any circuit or group of circuits. When the insulation resistance is less than 100 megohms between insulated conductor and ground (system ground point at the load center), the Contractor shall locate the point or points at fault, make proper corrections and then

demonstrate by further tests the elimination of such fault. With all equipment connected to the wiring system, a functional test shall be performed by the contractor using the system power, if not available the Contractor shall provide temporary power where and as required. The tests shall be performed in the presence of the Engineer to demonstrate that the system as a whole, and all parts thereof, function as specified or intended. Any defective materials, equipment or faulty or improper installation shall be permanently corrected by repairs or replacements to be made by the Contractor. All tests and any necessary repairs which are indicated by them to produce a fault-free system shall be performed at the Contractor's expense.

Operation Tests.
After satisfactory completion of the required tests, the system shall be placed in operation. Final acceptance will not be made until the system has operated satisfactorily, as designed, for a period of not less than 30 days from a date designated by the Engineer. This test period shall be included within the specific contract time. Operation of the system shall not in any way be construed as an acceptance of the system, or any part of it, or as a waiver of any of the provisions of the contract.

The Contractor shall be responsible for the system during this period of operation and they shall make any adjustments or repairs that may be required and remedy defects or damages which may occur, at their own expense.

Any other incidental work or materials for which no basis of payment is provided will be considered as completely covered by the unit price bid.

Method of Measurement

Highway lighting poles, area lighting poles and high mast towers, with the specified mounting heights, bracket arm of specified length and anchor bolts; luminaires of the size and type specified; photo electric control (including test switch); multiple control switch; multiple circuit contactor; time clock; and highway lighting load center, with all necessary nuts, bolts, connectors, clamps, equipment grounding connector, and incidental material to form a complete unit shall each be measured for payment as a unit.

Highway lighting shall be measured as a complete installation and paid at a contract lump sum price.

BASIS OF PAYMENT

The lump sum price for “Highway Lighting” and “Highway Lighting Load Center” shall be full compensation for all work necessary or incidental to the construction of the highway lighting installation, modifying existing installations, or both including excavation, backfilling, compaction, concrete foundations, conduit, wiring, and salvaging existing materials. All additional materials and labor required to complete the highway lighting installation shall be considered as incidental to the construction and be included in the respective lump sum contract price. All materials shall conform to Section 800: Traffic Control Devices and Division III: Materials Specifications of these specifications.

The accepted quantities of highway lighting poles, area lighting poles, high mast towers, luminaires, photo electric control (including test switch), multiple control switch, multiple circuit

ITEM 821.12 (Continued)
contactor and time clock will be paid for at the contract unit price each, for the length, type and size specified, which price shall include full compensation for anchor bolts and miscellaneous hardware.

No direct payment will be made for the following incidental materials: conduit fittings, all bolts, nuts and washers and wiring.

ITEM 824.501 FLASHING WARNING BEACON REMOVED AND RESET EACH

This work shall consist of furnishing and installing or modifying flashing beacons, speed feedback signs, highway illuminated wanting signs and lighted barrier arrows at designated locations as shown on the plans and detail sheets in conformance with these Specifications and the Standard Drawings. Included in the work is the furnishing and installing, modifying, removing, resetting, stacking or transporting existing control equipment, signal beads, electric lamps, posts and bases, poles, pedestals, mast arms, barriers, barrier arrows, service connections, wire and cable, pull and junction boxes, electrical conduits, and all incidental materials necessary for operating and controlling the beacons, signs and arrows. The locations of beacons, signs, barriers, control equipment and appurtenances shown on the plans are approximate and the exact location will be established by the Engineer in the field.

MATERIALS

General

When existing systems are to be modified, the existing equipment and materials shall be incorporated in the revised system, salvaged or abandoned as directed. Equipment and materials shall meet the requirements specified in Section 800: Traffic Control Devices for Signals & Wiring.

Highway Illuminated Warning Signs and Barrier Arrows

Illuminated warning signs and barrier arrows shall be designed so that lamps, tubes, electrodes, transformers or ballasts and all wiring shall be totally enclosed and protected from the weather. Each sign or arrow shall be delivered to the project completely finished and assembled, ready for erection.

Flasher

The flasher unit shall be two-circuit jack mounted using solid state circuiting (no moving parts) designed to operate on 105-130VAC, 60 Hz. The output load rating with incandescent traffic signal lamps or an inductive load shall not be less than 10 A. The unit shall be capable of providing alternating flashing operation at the rate of 50 to 60 flashes per minute. The flasher unit shall be individually housed and protected from the weather and must not present a shock hazard to maintenance personnel.

Filter

Each flasher shall be equipped with a suitable filter wired or built into the flasher in the manner recommended by the Manufacturer. Any filter not completely eliminating radio interference shall be replaced.

Housing

The combined flasher and filter shall be installed in an approved weatherproof housing equipped with a disconnect block for shutting off the system. The cabinet shall be fastened to a standard 8-

ft signal post by means of a suitable saddle or backplate. The flasher and filter shall be fastened to a backboard and the combined assembly shall be removable from the housing intact.

COMPENSATION

Method of Measurement

Flashing beacons, speed feedback signs, highway illuminated warning signs and lighted barrier arrows will be measured for payment by each.

Basis of Payment

Flashing beacons, speed feedback signs, highway illuminated warning signs and lighted barrier arrows will be paid for at the respective contract unit price per each, which price shall include all labor, materials, equipment and incidentals required to complete the work.

ITEM 852.11 TEMPORARY PEDESTRIAN BARRICADE FOOT
ITEM 852.12 TEMPORARY PEDESTRIAN CURB RAMP EACH

DESCRIPTION

Work under these items consist of furnishing, deploying, maintaining in proper operating conditions, and removing temporary pedestrian barricades and temporary pedestrian ramps as part of a Temporary Pedestrian Access Route (TPAR) in order to guide pedestrians around a fully- or partially-closed sidewalk. These devices are intended to prevent pedestrians from entering the work area and to prevent pedestrians from inadvertently entering the vehicle travel lane by providing visual and physical separation between each space.

MATERIALS

The Temporary Pedestrian Barricade shall have a continuous bottom rail or edge no more than two (2) inches above the ground and eight (8) inches in height (minimum) to accommodate cane users, have a smooth and continuous hand railing along the top edge no less than 32 inches above the ground and not obstruct or project into the pedestrian path of travel. Barricade walls shall be nearly vertical and generally within the same plane.

If exposed to traffic, Temporary Pedestrian Barricades shall be crashworthy.

The Temporary Pedestrian Curb Ramp shall provide a 48 inch minimum width, with a firm, stable, and non-slip surface. Protective edging with a two (2) inch minimum height shall be installed when the curb ramp or landing platform has a vertical drop of six (6) inches or greater.

The Temporary Pedestrian Curb Ramp walkway and landing area surface shall be of a solid, continuous, contrasting color abutting up to the existing sidewalk.

If a Temporary Pedestrian Curb Ramp leads to a crosswalk, a detectable warning pad must be used at the base of the ramp; if it leads to a protected path that does not conflict with vehicular traffic then a detectable pad shall not be used.

CONSTRUCTION METHODS

The Temporary Pedestrian Barricade shall be placed in an area that will provide pedestrians with a TPAR on a smooth, continuous hard surface for its entirety. The geometry and alignment of the facility shall meet the applicable requirements of the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities” and the Massachusetts Architectural Access Board.

The recommended width of the TPAR is 60 inches, but if constraints exist a minimum clear width of 48 inches shall be provided along its entirety. If a 60 inch width cannot be accommodated in full, a 60 inch by 60 inch passing space shall be provided every 200 feet or less along the TPAR.

Turning areas shall be 60 inches by 60 inches minimum.

Lateral joints between any surfaces shall not exceed 0.5 inches. Lateral edges may be vertical up to 0.25 inches high and shall be beveled at 1V:2H between 0.25 inches and 0.5 inches.
The TPAR shall be kept clear of debris, snow, and ice and the Temporary Pedestrian Barricades and Temporary Pedestrian Curb Ramps shall not obstruct drainage.

ITEM 852.11, 852.12 (Continued)

Removal and/or resetting of Temporary Pedestrian Barricades and Temporary Pedestrian Curb Ramps shall be considered incidental.

COMPENSATION

Payment for Temporary Pedestrian Barricades will be made at the contract price per foot installed in place, including all incidental items. This price shall include the cost of furnishing, installing, resetting, removal, and maintaining in good working condition.

Payment for Temporary Pedestrian Curb Ramps will be made at the contract price per each unit installed in place, including all incidental items. This price shall include the cost of furnishing, installing, resetting, removal, and maintaining in good working condition.

ITEM 864.1 **GREEN FRICTION SURFACE** **SQUARE FOOT**

The work shall be in accordance with the Standard Specifications for Highways and Bridges and Section 860 and the following. This work shall consist of furnishing and placing a Green Friction Surface (GFS) for bicycle safety, for bike boxes and approaches, lanes and other areas such as driveway crossings at intersection and as identified in the Contract Drawings.

The GFS shall be comprised of furnishing and installing a green color surface per Manual of Uniform Traffic Control Devices (MUTCD), and as shown on the plans.

The acceptable manufacturers and products and/or an equal manufactured product are as follows:

Traffic Calming USA
TrafficGrip (Coated Stone – Color Coated Aggregates)
Resin-based binder with color aggregate binding system
Description: TrafficGrip bike lane green stone is applied using epoxy. Our product is warranted for 4 years against UV fading.
Contact: Glyn Owen (glyn@trafficcalmingusa.com)
(770) 550-4044
317 A, NorthPoint Parkway
Acworth, Georgia, 30102
https://www.trafficcalmingusa.com/trafficgrip-hfs

Ennis-Flint
MMAX Colored Lane Treatment
Methyl-Methacrylate (MMA)
Description: Green color lane surface ideal for long lane areas with low to high vehicle traffic including cross-over points such as parking lot entries/exits along the corridor.
Contact: Don Bradford (dbradford@ennisflint.com)
(612) 508-8229
115 Todd Court
Thomasville, NC 27360
https://www.ennisflintamericas.com/catalog/product/view/id/1048/category/81

Ruby Lake
Color Coated Glass Aggregate
Description: Green color lane surface ideal for intersections, bike boxes, and conflict points with high volumes of vehicle traffic and lane crossings.
Contact: Jonathan Gross (jgross@rubylakeglass.com)
(607) 435-8158
493 State Route 28
Richfield Springs, NY 13439
https://www.rubylakeglass.com/pavement-markings-2/

ITEM 864.1 (Continued)

Transpo Industries, Inc.
Color-Safe®
Methyl-Methacrylate (MMA)
Description: Color-Safe® is your solution for long lasting bike paths, bus lanes, crosswalks, and pedestrian areas. It is an MMA based material that outperforms paint and epoxies in color retention and durability. Color-Safe® is available in standard and custom PMS colors and capable of full cure in a wide range of temperatures.
Contact: Michael S. Stenko (Mstenko@transpo.com)
(914) 636-1000
20 Jones Street
New Rochelle, NY 10801
https://www.transpo.com/roads-highways/materials/pavement-marking-material/color-safe-bike-lanes

QUALITY CONTROL

A. General

The installer shall submit a minimum of three projects with the owner's contact information on which Green Friction Surface for Bike safety has been placed within the past three years. An installer who does not meet this minimum shall be allowed if they are certified by the manufacturer to install and a manufacturer's representative is onsite during installations.

B. Quality Control (QC) Plan

The QC plan for furnishing and installing the Green Friction Surface shall detail installer's key personnel, equipment, materials, proposed methods of installation, materials blending procedures, monitoring of ambient temperature, proposed methods of curing and corrective action plan. The Contractor shall submit a QC plan with any pertinent shop drawings and product literature and materials safety data to the Engineer for approval at least 30 days prior to placement of the Control Section.

C. Control Section

The Contractor shall construct a control section with a minimum area of one square yard to represent The Green Friction Surface for Bike Lane. The green color, the surface texture, materials and installation, shall be presented for acceptance and approval by the Engineer prior to installation. The control section may be constructed as a Green Friction Surface on the project and if accepted may remain as part of completed work.

ITEM 864.1 (Continued)

EQUIPMENT AND APPLICATION REQUIREMENTS

A. Construction Requirements

A manufacturer's representative shall be present at the jobsite during construction of the control section. All construction operations shall meet the manufacturer's recommendations. Final approval will be given by the Engineer.

B. Weather Limitations

Green Friction Surface for Bike Lane shall not be placed on any wet surface or when the ambient temperature and humidity or the pavement temperature is below the manufacturer's recommendations or when the anticipated weather conditions would prevent the proper application and curing of the surface treatment as directed by the manufacturer's representative.

C. Surface Preparations

The surface shall be clean, dry and free of all dust, oil, debris and any other material that might interfere with the bond to the existing surface as recommended by the manufacturer's representative. The manufacturer's specification shall control the installation on any new HMA pavement paved in the previous 30 days with motor vehicle traffic or 60 days without motor vehicle traffic.

The contractor shall pre-treat any joints and cracks per the manufacturer's recommendation.

All existing edge line pavement markings that are adjacent to the GFS location shall be covered and protected as approved by the Engineer prior to performing surface preparation. GFS shall not be placed over existing pavement markings or rumble strips. Lane line pavement markings that conflict with the GFS installation shall be removed by methods approved by the manufacturer's representative. Any existing edge line pavement markings that are damaged during the GFS application process shall be replaced at the contractor's expense per direction of the Engineer.

GFS shall be allowed to cure for the minimum duration as recommended by the binder component supplier's specifications and during that time the application area shall be closed to all vehicles and contractor's equipment traffic. After placement and cure of the GFS, the Contractor shall test the finished surface to detect unbonded areas.

Excess and loose aggregate shall be removed from the traveled way and shoulders in such a way that the GFS is not damaged or disturbed. Excess aggregate that can be reused shall be clean, uncontaminated and dry, if it is to be re-used in the GFS application.

Utilities, drainage structures, curbs and any other structures within or adjacent to the treatment location shall be protected against the application of the GFS materials.

D. Surface Friction

The Contractor shall meet as a minimum the friction value for the surrounding pavement surface.

E. Application Methods

ITEM 864.1 (Continued)

GFS shall be applied in accordance with the manufacturer's recommendations. The GFS can be applied by either mechanical or manual techniques.

COMPENSATION

Method of Measurement

Item 864.1 will be measured for payment by the total square foot area of Green Friction Surface for Bike Lane and shall be the actual number of square feet furnished and installed as directed and approved by the Engineer.

Basis of Payment

Work under Item 864.1 Green Friction Surface for Bike Lane shall be paid for at the contract unit price per square foot which shall be full compensation for all labor, materials, tools, equipment, testing and incidental items necessary to complete the described work to the satisfaction of the Engineer.

ITEM 874.2 TRAFFIC SIGN REMOVED AND RESET EACH

The work under these Items shall conform to the relevant provisions of Section 840 of the Standard Specifications and the following:

CONSTRUCTION METHODS

The Contractor shall carefully remove all existing signs, attachment hardware and sign support posts as shown on the drawings and as directed by the Engineer. Existing foundations shall be removed to a depth of at least 12 inches below proposed sidewalk grade and 36 inches below proposed roadway grade. The holes shall be backfilled with gravel. The surface shall be patched with a material to match the existing ground or as directed by the Engineer.

Signs and attachment hardware shall be satisfactorily stored and protected until reset in the proposed work. Sign support posts shall be disposed of in a satisfactory manner. New sign support posts shall be provided as called for under Item 847.1.

Signs and attachment hardware lost, damaged or otherwise made unsuitable for reuse while being removed, transported, stored or reset shall be replaced with new material at no additional cost. New attachment hardware shall be furnished and installed as necessary to replace any missing or unusable existing hardware.

The sign shall be mounted in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and the 1990 Standard Drawings for Signs and Supports. Sign panels shall be cleaned before being reset.

ITEM 874.4 TRAFFIC SIGN REMOVED AND STACKED EACH

GENERAL

Work under this item shall conform to the relevant provisions under Section 800 of the standard specifications and the following:

Work shall include the removal and stacking of existing traffic signs, including street name signs as shown on the plans. The signs and hardware shall be disassembled prior to stacking. The removed and stacked signs and posts shall be stacked on boards at a secure offsite location to be furnished and paid for by the Contractor. The signs and posts will be picked up by the Town before construction acceptance concludes. If any of the removed and stacked signs are damaged or destroyed, they shall be replaced in kind by the Contractor with new signs and/or posts at the Contractor's own expense. The Contractor shall assist the Town in loading the materials for transport.

The Contractor shall completely remove the sign. If existing sign and/or post are damaged by the Contractor during the removal and stacking process, a new sign and post of the same size and material shall be provided to the Town at the Contractor's expense.

Additional traffic signs that have been removed by the Contractor and not wanted by the Town shall become property of the Contractor with no additional compensation for disposal.
The Contractor shall provide a receipt signed by the Town to the Engineer for payment.

COMPENSATION

Method of Measurement

Traffic sign removed and stacked will be measured for payment by each.

Basis of Payment

Traffic sign removed and reset will be paid for at the Contract unit price per Each, which price shall include all labor, materials, equipment and incidentals required to complete the work.

ITEM 999.01 GRANITE MONUMENT RELOCATION LUMP SUM

GENERAL

Work under this item shall conform to the relevant provisions under Sections 100, 300, 400, 600, and 900 of the standard specifications and the following:

Work shall include the removal, storage, and relocation of existing granite blocks, trough, and stone, including water service connections, electrical connections, and ornamental street signs as shown on the plans. The sign and hardware shall be disassembled prior to stacking. The removed and stacked signs and posts shall be stacked on boards at a secure offsite location to be furnished and paid for by the Contractor. If any of the removed and stacked signs are damaged or destroyed, they shall be replaced in kind by the Contractor with new signs and/or posts at the Contractor's own expense. The Contractor shall assist the Town in loading the materials for transport.

The Contractor shall completely relocate the granite trough and associated granite blocks. If existing granite trough and/or granite blocks are damaged by the Contractor during the removal and stacking process, a new granite trough and blocks of the same size, material, and character shall be provided to the Town at the Contractor's expense.

1. Contractor shall submit to the owner for approval a plan for the concrete footing and subbase with a Professional Engineer's stamp.

2. Contractor to conduct meeting in field with Town and Engineer prior to removing, storing and relocating granite monument. Contractor to furnish workplan for the disassembly, transportation and storage of granite monument.

3. Contractor to maintain secure and adequate storage area for granite monument throughout contract duration.

QUALITY ASSURANCE

Contractor Qualifications:

1. Contractor shall conform to all local, state/provincial licensing and bonding requirements.

Method of Measurement

Granite Monument Relocation will be measured for payment by lump sum.

Basis of Payment

The Granite Monument Relocation will be paid per Lump Sum, which price shall include all labor, materials, equipment and incidentals required to complete the work.