New Jersey Turnpike Authority
P.O. Box 5042, Woodbridge, NJ 07095

August 6, 2021

Document Change Announcement

2016 Standard Supplementary Specifications
Longitudinal Barriers
DCA2021SS-05

Subject: Revisions to

Section 508 Concrete Median Barrier
Section 510 Guide Rail
Section 524 Impact Attenuator
Section 801 Traffic Control on Authority Roadways
Section 915 Beam Guide Rail
Section 920 Traffic Control Devices

Description of Change:

Various sections/drawings of the Authority's Standard Drawings, 2016 Standard Supplementary Specifications, and Design Manual pertaining to guide rail, curb, bridge parapet, roadway and bridge median barrier, median fencing, and attenuators have been for updated MASH 2016 compliance.

Notice to New Jersey Turnpike Authority Staff and Design Consultants
Effective immediately, all contracts currently in the design phase shall incorporate the revisions herein. For advertised contracts awaiting the opening of bids this revision shall be incorporated via addendum. Contact your New Jersey Turnpike Authority Project Manager for instruction.

The revisions may be accessed on the Authority's webpage: https://www.njta.com/doing-business/professional-services

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NOTE: The following text is ADDED to the latest version of the 2016 Standard Supplementary Specifications.

SECTION 508 – CONCRETE MEDIAN BARRIER

508.03 Methods of Construction.

Insert the following after the 11th paragraph:

Modified concrete median barrier, protection will require site specific forms different than those normally associated with this work. Special extrusion (slip-form) equipment and techniques will be required for molding the variable height barrier transition sections.

508.04 Measurement.

Insert the following after the 2nd paragraph:

Variable height barrier transition section lengths for modified concrete median barrier protection are included in the payment lengths for modified concrete median barrier, protection as shown on the plans.

508.05 Payment.

The following is added:

PAY ITEM	*PAY UNIT*
MODIFIED CONCRETE MEDIAN BARRIER, PROTECTION	LINEAR FOOT

Delete the 4th paragraph and replace it with the following:

Concrete median barrier and modified concrete median barrier in protection areas are to be paid for in linear feet based on each side of the protected area. No separate payment will be made for common embankment or 4-inch concrete slab between barrier protection.

NOTE: The following text REPLACES its respective Section in the latest version of the 2016 Standard Supplementary Specifications.

SECTION 510 – GUIDE RAIL

Delete this Section in its entirety and replace with the following:

510.01 Description.

Guide Rail shall consist of steel rail elements mounted on steel posts and recycled/synthetic blockouts, with anchorages, connections, terminals, and other guide rail appurtenances in accordance with the Plans. Work shall include removal, furnishing and installing, salvaging existing single-faced and dual-faced beam guide rail, and resetting guide rail with salvaged material. Work shall also include furnishing and installing side mounted delineators along the beam guide rail element.

When applicable, this work shall also include the installation of end terminals in accordance with manufacturer's recommendations. The Contractor and Subcontractor (if applicable) will be required to have their foremen and superintendents (at a minimum) attend a mandatory training session presented by the manufacturer, prior to the start of construction.

Refer to Section 524 when terminating single-faced or dual-faced beam guide rail with a re-directive impact attenuator.

510.02 Materials.

Materials shall conform to the following Subsections:

RAIL ELEMENT 915.01
POSTS AND RECYCLED/SYNTHETIC BLOCKOUTS.....915.02
RUB RAIL.....915.05
MISCELLANEOUS HARDWARE 915.03
GUIDE RAIL DELINEATORS 915.06
TERMINALS AND ANCHORAGES.....915.07

Portland cement concrete for anchorages and post foundations shall conform to Section 905, Class B.

All metal components along the New Jersey Turnpike and Garden State Parkway shall be galvanized in accordance with Subsection 909.11. All galvanized metal components along the Garden State Parkway shall be pre-stained with a reactive color treatment in accordance with Section 915.01.

510.03 Methods of Construction.

Prior to installing posts, the location of underground electrical conduits and other utilities, which may conflict with the posts, shall be determined. The Contractor must contact New Jersey One Call on-line (www.nj1-call.org) or by dialing 811 or (800) 272-1000 for a utility mark-out in accordance with Subsection 106.18. Post spacing may be adjusted by 6 inches, as approved by the Engineer, to eliminate such conflicts. The Contractor's attention is directed to Subsection 106.18, pertaining to utilities. Test pits, as directed, shall be made as specified in Section 522.

The rail elements shall be constructed with the top edge in a straight line or smooth curve parallel to or concentric with the roadway. Where a vertical transition is required, the top edge of rail elements shall form the chords of a smooth vertical curve. The top of rail element height for all new guide rail installations shall be 31 inches. New guide rail shall be constructed with an allowable tolerance of +1 inch to -1 inch for the

top of rail element height. The absolute tolerance for the top of rail element height for 31-inch-tall guide rail is +1 inch to -3 inches for rehabilitation projects.

Attach the beam guide rail element to the blockout at every post. No punching, drilling, reaming, or cutting of the rail elements will be permitted in the field unless specifically approved by the Engineer. Neither torchcutting nor welding of rail elements will be permitted. All new material shall be furnished, except where resetting or salvaging is called for. Damaged galvanized surfaces shall be repaired in accordance with Subsection 403.16. Repair damage to the pre-stained galvanized coating, if applicable, according to Subsection 915.01. Galvanized and pre-stained galvanized coatings damaged during installation of the beam guide rail, anchorages, connections, and treatments as shown on the Plans shall be repaired at the contractor's expense.

The installation shall be made in such a manner that no unprotected end is exposed to approaching traffic.

(A) BEAM GUIDE RAIL.

Within the same working day, replace all existing beam guide rail that is removed. Where possible, install new beam guide rail exposed to approaching traffic before the removal of the existing system.

If it is suspected that utility conduit is present, the Engineer may require tests to ensure the integrity of the conduit if it is suspected that the conduit may have been damaged during installation of the guide rail. The tests may include, but are not limited to:

1. Tests for continuity.
2. Tests for ground.
3. Tests for insulation resistance between circuit wires and from circuit wires to ground.

Locate and repair damage to the utility conduit due to construction operations.

Drive beam guide rail posts to the required position. Ensure that posts are driven plumb, properly spaced, and to the line and grade shown.

Install the required connections and attachment types as shown on the Plans. Mount bridge beam guide rail posts as shown on the Plans.

Repair damage to the galvanized coating according to Subsection 403.16.

Repair damage to the pre-stained galvanized coating, if applicable, according to Subsection 915.01.

Install guide rail delineators in accordance with the standard drawings and Subsection 915.06.

(B) PARAPET CONNECTIONS.

Parapet connections of the types required shall consist of terminal connector, back-up plate(s), rail element(s), posts, and blockouts. Bolt holes through the parapets shall be core drilled through existing parapets or formed through new parapets using non-corrosive sleeves for each bolt.

(C) RUB RAIL.

When rub rail is required, bolt rub rail consisting of a steel channel or a bent plate to the beam guide rail posts.

(D) TERMINALS AND ANCHORAGES.

At least 10 days before beginning the work, submit the manufacturer's recommendations to the Engineer. Install terminals and anchorages according to the manufacturer's recommendations.

Excavate for post holes and concrete anchorages as specified in Subsection 206.03. Backfill and compact using the directed method as specified in Subsection 206.03.

Excavate cut slope as specified in Subsection 206.03 within the limits of the buried guide rail end terminal. Drive beam guide rail posts for buried guide rail terminal to the required position. Ensure that posts are driven plumb, properly spaced, and to the line and grade shown. Attach the beam guide rail element to

the blockout at every post. Attach the beam guide rail element and plate to the terminal posts. Backfill with excavated material as specified in Subsection 206.03.

(E) RESET BEAM GUIDE RAIL.

Reset Beam Guide Rail consists of using salvaged material to construct the specified item.

The salvaged material shall be carefully loaded at the location specified and transported to the area where it is to be installed. Available salvaged material shall consist of beam guide rail elements, posts, blockouts, nuts, bolts, washers, and plates, unless otherwise specified. Salvaged material may include pre-stained beam guide rail elements, posts, and other metal components. Any salvaged material damaged due to carelessness, shall be replaced without additional compensation.

In areas designated on the plans, salvaged beam guide rail shall be reset using recycled/synthetic blockouts in place of the existing steel or wooden blockouts. The contractor shall supply new hardware as required for the installation of the salvaged beam guide rail on new recycled/synthetic blockouts. For galvanized steel beam guide rail elements and galvanized posts, the bolt holes for the recycled/synthetic blockouts shall be treated in accordance with Subsection 403.16. Posts damaged during the drilling of bolt holes shall be replaced at the contractor's expense.

Work will also entail installing guide rail delineators in accordance with Paragraph 510.03(A).

(F) REMOVAL OF BEAM GUIDE RAIL.

Removal of Beam Guide Rail shall consist of dismantling, removing and disposal of guide rail elements, posts, blockouts and hardware. Work shall include cutting existing anchor bolts flush with concrete surfaces and refilling and patching post holes with material similar to that of the adjoining area.

After removing beam guide rail, backfill the post holes and compact the area to the elevation of the adjacent surface. Materials and debris shall be disposed of in accordance with all applicable Federal, State and Local laws.

(G) BEAM GUIDE RAIL POST, ____' LONG.

Beam Guide Rail Post, ____' Long shall consist of the installation of various lengths of new rail posts in excess of 6 feet long as specified in Paragraph 510.03(A), including the recycled/synthetic blockout and required hardware for mounting to the beam guide rail element.

(H) BEAM GUIDE RAIL ELEMENT.

Beam Guide Rail Element shall consist of the installation of new rail element on existing beam guide rail blockouts in accordance with Paragraph 510.03(A) and shall include the required hardware for mounting the beam guide rail element to the existing blockout.

Work will also entail installing guide rail delineators in accordance with Paragraph 510.03(A).

(I) BEAM GUIDE RAIL BLOCKOUT.

Beam Guide Rail Blockout shall consist of the installation of new blockouts between existing beam guide rail element and beam guide rail posts in accordance with Paragraph 510.03(A) and shall include the required hardware for mounting to the beam guide rail element and the beam guide rail posts.

Where beam guide rail is attached to a structure, attach the blockout to the structure. Reset the beam guide rail, as specified in Paragraph 510.03(E) to provide a smooth transition to the existing structure.

510.04 Measurement.

Beam Guide Rail will be measured by the length in place along the face of rail between centers of end posts, excluding the pay limits for parapet connections, anchorages, and end terminals. Dual- faced rail items will be measured by the linear foot along the face of one rail excluding the pay limits for anchorages and end terminals.

Beam Guide Rail Element and Rub Rail will be measured by the linear foot along the face of the rail measured from centers of end posts.

Beam Guide Rail Anchorages, Parapet Connections, Beam Guide Rail Buried End Terminals, Tangent Guide Rail Terminals, and Beam Guide Rail Blockouts will be measured by the number of each installed to the limits as indicated on the plans. Anchorages and parapet connections for dual faced beam guide will be measured by the number installed for each face of rail.

Beam Guide Rail Posts and Beam Guide Rail Posts, ____' Long, that are in addition to those included under the various guide rail items, will be measured by the number of each post of the indicated length installed.

Reset Beam Guide Rail will be measured as specified above for Beam Guide Rail.

Removal of Beam Guide Rail will be measured by length of existing beam guide rail removed, as shown on the plans, and as directed by the Engineer.

No separate measurement will be made for the guide rail delineators or for the hardware used to attach the delineators to the face of the beam guide rail element.

No separate measurement will be made for new hardware as needed for resetting beam guide rail.

No separate measurement will be made for the end section (rounded or buffer) associated with the beam guide rail and anchorages as shown on the Plans.

510.05 Payment.

Payment will be made under:

PAY ITEM	*PAY UNIT*
BEAM GUIDE RAIL	LINEAR FOOT
BEAM GUIDE RAIL, PRE-STAINED	LINEAR FOOT
BEAM GUIDE RAIL, DUAL-FACED	LINEAR FOOT
BEAM GUIDE RAIL, DUAL-FACED, PRE-STAINED	LINEAR FOOT
BEAM GUIDE RAIL ELEMENT	LINEAR FOOT
BEAM GUIDE RAIL ELEMENT, PRE-STAINED	LINEAR FOOT
RESET BEAM GUIDE RAIL	LINEAR FOOT
RESET BEAM GUIDE RAIL, DUAL FACED	LINEAR FOOT
BEAM GUIDE RAIL BLOCKOUT	EACH
BEAM GUIDE RAIL ANCHORAGE	EACH
BEAM GUIDE RAIL ANCHORAGE, PRE-STAINED	EACH
PARAPET CONNECTION, TYPE A	EACH
PARAPET CONNECTION, TYPE A, PRE-STAINED	EACH
PARAPET CONNECTION, TYPE B	EACH
PARAPET CONNECTION, TYPE B, PRE-STAINED	EACH
BEAM GUIDE RAIL BURIED END TERMINAL	EACH
BEAM GUIDE RAIL BURIED END TERMINAL, PRE-STAINED	EACH
TANGENT GUIDE RAIL TERMINAL	EACH
TANGENT GUIDE RAIL TERMINAL, PRE-STAINED	EACH
BEAM GUIDE RAIL POST	EACH
BEAM GUIDE RAIL POST, PRE-STAINED	EACH
BEAM GUIDE RAIL POST, ____' LONG	EACH
BEAM GUIDE RAIL POST, ____' LONG, PRE-STAINED	EACH

REMOVAL OF BEAM GUIDE RAIL	LINEAR FOOT
RUB RAIL	LINEAR FOOT
RUB RAIL, PRE-STAINED	LINEAR FOOT

Test Pits will be paid for in accordance with Section 522. Separate payment will not be made for other excavation and backfill.

No separate payment will be made for the guide rail delineators or for the hardware used to attach the delineators to the face of the beam guide rail element.

No separate payment will made for new hardware as needed for resetting beam guide rail.

No separate payment will be made for the end section (rounded or buffer) associated with the beam guide rail and anchorages as shown on the Plans.

NOTE: The following text REPLACES its respective Section in the latest version of the 2016 Standard Supplementary Specifications.

SECTION 524 – IMPACT ATTENUATOR

Delete this Section in its entirety and replace with the following:

524.01 Description.

This work shall consist of the furnishing and installing re-directive impact attenuators and transitions as identified on the Plans. The attenuator shall be installed as per the manufacturer's directions and shall include appropriate transitions to longitudinal barrier or dual faced guide rail if present. Non-redirective attenuators shall not be used for a permanent installation; use of non-redirective attenuators for temporary installations shall be as specified under Section 801. Re-directive attenuators may be used in a construction zone on a temporary basis as specified under Section 801.

This work shall also consist of the furnishing and installation of bullnose thrie beam attenuators at wide Z-Turns and other locations shown on the Plans, in accordance with the Authority's Standard Drawing.

524.02 Materials.

Materials shall conform to the following Subsections:

RE-DIRECTIVE IMPACT ATTENUATOR.....920.20

The attenuator transition shall provide the necessary transition to the longitudinal barrier (beam guide rail, dual faced beam guide rail, or concrete barrier) in accordance with the attenuator manufacturer's recommendation.

Foundation and additional material requirements shall be in accordance with the attenuator manufacturer's recommendations. Unless otherwise specified by the manufacturer foundation concrete for the permanent systems shall be at least 4,000 psi. Reinforcement steel shall be epoxy coated. Concrete and reinforcement steel shall conform to Subsection 401.02. Asphalt foundations shall use materials conforming to Subsection 302.02.

Reflective sheeting which appears at the blunt end of impact attenuators shall conform to Subsection 912.02.

524.03 Methods of Construction.

Attenuators shall be installed in accordance with the manufacturer's directions and as indicated on the Plans. Attenuator system designs are independently evaluated for MASH compliance and unless indicated by the attenuator system manufacturer, components from different attenuator systems are not to be interchanged.

The contractor shall be responsible for preparing the surface on which the attenuator will be installed; this may include constructing a prepared foundation of the type indicated and to the dimensions and grades as shown on the Plans and as required by the attenuator system manufacturer. If a foundation is required, it shall be cured to full strength before exposing the attenuator system to potential impacts. If the attenuator is using a previously constructed foundation, that foundation shall be inspected for deficiencies inadequate slope, signs of cracking, surface wear, shifting from original position, settling, or any other signs of age or deterioration which could make the foundation unusable. Any deficiencies shall be flagged and brought to the Engineer's attention prior to installation.

Install the attenuator according to the manufacturer's directions for the type of obstruction being shielded and the type of transition being used. The Contractor shall be certified in accordance with the manufacturer's requirements to perform installation.

All new material shall be furnished, except where resetting or salvaging is called for on the Plans.

Any damage to the attenuator system caused by Contractor actions shall be immediately replaced/repaired as directed by the Engineer at no additional cost to the Authority.

Some attenuators have features that may allow the attenuator system to be reset with minimal part replacement after an impact. If the Authority directs for an attenuator to be reset, the Contractor shall be familiar with the attenuator manufacturer's requirements and shall inspect and evaluate the attenuator prior to resetting. A list of any damaged elements to be replaced shall be provided to the Engineer who will make the final determination if the attenuator can be repaired or if a new attenuator should be installed instead. If it is determined by the Engineer that the attenuator is suitable to be repaired and reset, the Contractor shall replace all damaged elements with new elements prior to resetting the attenuator. Upon resetting the attenuator, and prior to exposing the attenuator to traffic, a final inspection shall occur to ensure that the attenuator conforms to the attenuators manufacturer's requirements.

524.04 Measurement.

Impact Attenuator (Cartridge), ___Bays, ___" Wide shall be measured by the number of each installed. Each unit shall consist of a total energy absorbing system composed of the required number of bays and required width.

Impact Attenuator, Type_____ will be measured by the number of each installed.

Bullnose Thrie Beam Attenuator will be measured by the number of each installed.

Repair and Reset Impact Attenuator, Type _____ and Repair and Reset Impact Attenuator (Cartridge), ___Bays, ___" Wide will be measured by the number of each impact attenuator unit repaired and reset.

For re-directive impact attenuators installed on a temporary basis see Section 801.

524.05 Payment.

Payment will be made under:

PAY ITEM	*PAY UNIT*
IMPACT ATTENUATOR (CARTRIDGE), ___ BAYS, ___" WIDE	EACH
IMPACT ATTENUATOR, TYPE ____	EACH
BULLNOSE THRIE BEAM ATTENUATOR	EACH
REPAIR AND RESET IMPACT ATTENUATOR (CARTRIDGE), __ BAYS, __" WIDE	EACH
REPAIR AND RESET IMPACT ATTENUATOR, TYPE _____	EACH

No separate payment will be made for concrete, anchors, concrete foundations, epoxy coated reinforcement, reflective sheeting, or transitions to longitudinal barrier, but the costs thereof will be included in the unit prices bid for the various impact attenuator pay items in the Contract.

No payment will be made for repair or replacement of impact attenuators damaged by the Contractor's operations.

NOTE: The following text REPLACES its respective Section in the latest version of the 2016 Standard Supplementary Specifications.

SECTION 801 – TRAFFIC CONTROL ON AUTHORITY ROADWAYS

801.02 Materials.

Delete the following:

IMPACT ATTENUATOR (QUADGUARD) 524

Add the following:

CONCRETE MOUNTED DELINEATORS .....923.18(A)

RE-DIRECTIVE IMPACT ATTENUATOR.....920.20

801.03 Methods of Construction.

(C) Traffic Control Devices.

(2) Precast Concrete Construction Barrier.

Delete this Subparagraph in its entirety and replace it with the following:

Precast concrete construction barrier shall be inspected and approved by the Engineer prior to delivery to the job site. The precast concrete construction barrier shall meet the criteria set forth below. The Engineer shall be the sole judge of the acceptability of the precast concrete barrier. Precast concrete barrier deemed unsatisfactory by the Engineer shall not be used. Precast concrete barrier that is damaged or deteriorates during the course of the Project shall be replaced at no additional cost to the Authority.

Where different joint classifications are required within a section of barrier, the controlling joint class shall extend a minimum of one complete barrier length before and after the work area. For example, where A and D are required, Joint Class D shall extend a minimum of one complete barrier length before and after the work area before changing to Joint Class A.

The concrete construction barrier may be installed after the removal of existing surfacing and removed prior to paving, unless otherwise shown on Plans, if site conditions and construction sequence require doing so.

The Contractor shall furnish all hardware, concrete barrier interlock devices, anchors and all else necessary for the complete installation and subsequent removal and/or relocation of the concrete barrier.

The Contractor shall be required to maintain the concrete barrier units in their correct alignment at all times. The Contractor shall promptly furnish (any time of the day or night upon notification from the Authority, State Police or the Engineer) all labor, materials and equipment as necessary to repair, reset and/or realign any portion of concrete barrier units damaged or displaced by traffic incidents or otherwise. All Contractor-furnished devices shall remain the property of the Contractor and shall be removed by the Contractor upon completion of the work.

All precast concrete construction barrier that does not meet the following criteria, as determined by the Engineer prior to placement on the roadway, shall be rejected for use:

- No more than three cracks in the middle 6 feet of the barrier.
- All cracks must be less than ⅛ inch wide.
- No gouges in the lower half of the face exposed to traffic.

- No reinforcing steel shall be exposed.
- The keyway must be intact.
- Lifting devices shall be intact.
- Face exposed to traffic must be clean of all road dirt.
- Concrete barrier delineators shall be in place.
- Interlock must accept key full depth without Projection of key cap above barrier.
- The full keyway must be available.

Precast concrete construction barrier that becomes damaged shall be replaced within 24-hours, as directed by the Engineer.

The Contractor shall clean and maintain the drainage slots at the bottom of the concrete construction barrier at all times as directed by the Engineer.

Delete Part 801.03(C)(4) and replace it with the following:

(4) Temporary Impact Attenuators (Array).

Temporary Impact Attenuators (Array) refer to non-redirective sand-filled polyethylene plastic frangible modules. Temporary impact attenuator modules which are lost, stolen, damaged, destroyed or determined by the Engineer to be unacceptable shall be replaced without additional compensation.

Attenuators shall be installed in accordance with the manufacturer's directions and as indicated on the Plans. Attenuator system designs are independently evaluated for MASH compliance and unless indicated by the attenuator system manufacturer, components from different attenuator systems are not to be interchanged.

The contractor shall be responsible for preparing the surface to the dimensions and grades as shown on the Plans and as required by the attenuator system manufacturer on which the attenuator will be installed.

Install the attenuator according to the manufacturer's directions for the type of obstruction being shielded and the type of transition being used. The Contractor shall be certified in accordance with the manufacturer's requirements to perform installation.

The Contractor shall notify the Engineer immediately upon discovery of any damaged temporary impact attenuator module and shall immediately replace or repair all damaged modules. The Contractor shall have on the Project an adequate number of spare modules to repair any damaged attenuator unit. Any modules of a unit or sand which are damaged due to the Contractor's carelessness while placing, or due to the operation of the Contractor's equipment or personnel after such placement, shall be replaced at no additional cost to the Authority.

All new material shall be furnished, except where resetting or salvaging is called for on the Plans.

Delete Part 801.03(C)(5) and replace it with the following:

(5) Temporary Re-directive Impact Attenuators.

Temporary Impact Attenuators (Cartridge) and Temporary Impact Attenuators, Type ____ refer to re-directive impact attenuators and transitions as identified on the Plans.

For re-directive impact attenuators installed in a construction zone on a temporary basis, work shall also include the maintenance of the attenuator during construction, repair or replacement during construction, relocation to a different area, removal upon completion and the restoration of pavement after removal.

Refer to Section 524 for additional requirements.

The following is added:

(C) Holidays, Restrictions, and Special Provisions

[Insert text as necessary]

801.04 Measurement.

Delete the 8th paragraph and replace it with the following:

Furnishing Portable Variable Message Sign will be measured by the number of each and will be limited to the maximum number provided in the Contract, which is installed simultaneously, plus one spare sign which must be retained by the Contractor for use in this Contract. Sign placement, removal and maintenance will not be measured separately for payment.

Delete the 9th paragraph and replace it with the following:

Furnishing Temporary Impact Attenuator (Array), ___ MPH will be measured by the number of each complete unit (barrel configuration) installed to the maximum number provided in the Proposal that are installed simultaneously.

Delete the 10th paragraph and replace it with the following:

Placing and Removing Temporary Impact Attenuator (Array), ____ MPH will be measured by the total number of complete units placed in each location as prescribed by the plans and as accepted by the Engineer. Removal, relocating or resetting of temporary impact attenuators will not be measured separately for payment.

Delete the 11th paragraph and replace it with the following:

Repair and Reset Temporary Impact Attenuator (Array), Module will be measured by the total number of modules requiring replacement or repairs in each barrier system, either damaged or destroyed by the traveling public and as directed by the Engineer. Modules damaged by Contractor operations will not be measured for payment.

Delete the 19th paragraph and replace it with the following:

Furnishing Temporary Impact Attenuator (Cartridge), ___Bays, ___" Wide will be measured by the number of each complete unit installed to the maximum number provided in the Proposal that are installed simultaneously. The following is added to the end of the Subsection:

Placing and Removing Temporary Impact Attenuator (Cartridge) will be measured by the total number of complete units placed in each location as prescribed by the plans and as accepted by the Engineer. Removal of temporary impact attenuators will not be measured for payment.

Repair and Reset Temporary Impact Attenuators (Cartridge) will be measured by the number of each complete unit to be replaced or repaired, either damaged or destroyed by the traveling public and as directed by the Engineer. Units damaged by Contractor operations will not be measured for payment.

Furnishing Temporary Impact Attenuator, Type ___ will be measured by the number of each complete unit installed to the maximum number provided in the Proposal that are installed simultaneously.

Placing and Removing Temporary Impact Attenuator, Type ___ will be measured by the total number of complete units placed in each location as prescribed by the plans and as accepted by the Engineer. Removal of temporary impact attenuators will not be measured for payment.

Repair and Reset Temporary Impact Attenuators, Type ___ will be measured by the number of each complete unit to be replaced or repaired, either damaged or destroyed by the traveling public and as directed by the Engineer. Units damaged by Contractor operations will not be measured for payment.

The following is added:

Installation, Maintenance, and Removal of Lane Closing will be measured by the number of each or percentage thereof (as described in Subsection 801.05), installed, maintained, and removed. See Subsection

801.05 for payment of Supplementary Lane Closings. Lane or shoulder closings for "Force Account", "If and Where Directed by the Engineer", "Change Order" or "Emergency" work will be measured in accordance with Subsection 108.04.

No separate payment will be made for lane closings and supplementary lane closings, but the costs thereof will be included in the unit price bid for the pay item "Furnishing Traffic Control Devices."

Replace the entire Subsection with the following:

Maintenance and Protection of Traffic will be measured on a lump sum basis and shall include all equipment, labor material or expense to install, maintain and remove maintenance and protection of traffic for the Contract.

801.05 Payment.

The following items are removed:

PAY ITEM	*PAY UNIT*
FURNISHING TEMPORARY IMPACT ATTENUATOR	EACH
PLACING AND REMOVING TEMPORARY IMPACT ATTENUATOR	EACH
REPAIR TEMPORARY IMPACT ATTENUATORS	BARREL

The following items are added:

PAY ITEM	*PAY UNIT*
FURNISHING TEMPORARY IMPACT ATTENUATOR (ARRAY), ____MPH	EACH
PLACING AND REMOVING TEMPORARY IMPACT ATTENUATOR (ARRAY), ____MPH	EACH
REPAIR AND RESET TEMPORARY IMPACT ATTENUATOR (ARRAY) MODULE	EACH
FURNISHING TEMPORARY IMPACT ATTENUATOR (CARTRIDGE), __ BAYS, __" WIDE	EACH
PLACING AND REMOVING TEMPORARY IMPACT ATTENUATOR (CARTRIDGE)	EACH
REPAIR AND RESET TEMPORARY IMPACT ATTENUATOR (CARTRIDGE)	EACH
FURNISHING TEMPORARY IMPACT ATTENUATOR, TYPE ____	EACH
PLACING AND REMOVING TEMPORARY IMPACT ATTENUATOR, TYPE ____	EACH
REPAIR AND RESET TEMPORARY IMPACT ATTENUATOR, TYPE ____	EACH

Delete the 10th paragraph and replace it with the following:

No separate payment will be made for repairing impact attenuator modules damaged by Contractor operations.

Delete the 13th paragraph and replace it with the following:

Payment for permanent Impact Attenuators to remain shall be in accordance with Subsection 524.05.

The following is added:

PAY ITEM	*PAY UNIT*
INSTALLATION, MAINTENANCE AND REMOVAL OF LANE CLOSINGS	EACH

The following is added:

PAY ITEM	*PAY UNIT*
MAINTENANCE AND PROTECTION OF TRAFFIC	LUMP SUM

A partial payment of 25% of the unit price bid for the pay item **"Installation, Maintenance, and Removal of Lane Closing"** will be made for the following closings:

- Supplementary lane closings installed adjacent to a right or left lane closing.
- Short duration lane closings required prior to or following the primary lane closing (pre and post closings) for temporary striping, concrete barrier placement and removal, and striping restoration.
- Lane closings that are cancelled or delayed by the Authority after the Contractor is mobilized.
- Ramp closings including those required in conjunction with mainline closings and pre and post ramp closings.
- Extension of an existing lane closing, as directed by the Engineer to perform additional work.
- The length of extension is anticipated not to exceed one mile.
- Shoulder Closings (those not requiring lane shifts).

Lane closings for lane shift installations will be paid for at 100% of the unit price bid for the pay item **"Installation, Maintenance, and Removal of Lane Closing"**, regardless of the number of lanes shifted.

Short duration lane closings required on mainline roadways for installation and removal of catches on overhead structures will be paid for at 100% of the unit price bid for the pay item **"Installation, Maintenance, and Removal of Lane Closing".**

Supplementary right or left lane closings installed adjacent to right or left shoulder closings will be paid for at 100% of the unit price bid for the pay item **"Installation, Maintenance, and Removal of Lane Closing."**

Payment for mainline shoulder and half-ramp closings will be made for only those closings noted in the staging write-up and will be paid for under the pay item **"Installation, Maintenance and Removal of Lane Closing."** All other closings (i.e. partial or short sections of ramp closings) will not be paid for separately.

NOTE: The following text is ADDED to the latest version of the 2016 Standard Supplementary Specifications.

SECTION 915 – BEAM GUIDE RAIL

Delete this Section in its entirety and replace with the following:

915.01 Rail Element.

Rail elements shall be 12-gauge galvanized steel unless noted on the Plans.

Galvanized beam guide rail elements, including transition sections, connections, end treatments, rounded end sections and buffer end sections, shall be fabricated according to AASHTO M 180, Class A, Type I in Table 1. Ensure that the weight of the zinc coating conforms to AASHTO M 180, Type I in Table 2.

Galvanized beam guide rail on the Garden State Parkway shall be pre-stained with a reactive color treatment prior to installation to create a uniform, rustic brown matte finish. The stain product shall be non-toxic and non-hazardous and shall be applied according to the product manufacturer's specifications. The stain product shall penetrate the surface of the steel elements without harming the protective galvanized layer. The stain product finish shall be long lasting and resistant to fading, cracking, or peeling from the sun. The stain product finish shall also be resistant to degradation from exposure to roadway salt and weather elements. Treated rail elements shall be stored and transported to the installation site in accordance with the product manufacturer's recommendations. Treated beam guide rail that is damaged, as determined by the Engineer, shall be replaced or repaired in accordance with the reactive color treatment product manufacturer's recommendations.

915.02 Posts and Recycled/Synthetic Blockouts.

Steel posts shall be fabricated using structural steel conforming to ASTM A 709, Grade 36, and galvanized according to ASTM A 123.

Galvanized steel posts on the Garden State Parkway shall be pre-stained in accordance with Subsection 915.01.

Timber posts for end terminals shall conform to Subsection 910.05.

Use recycled/synthetic routed blockouts that are MASH 2016 test level 3 (TL-3) compliant. Ensure that the name of the manufacturer and model number are stamped on each blockout and that the blockouts are of the same material and dimensions as the spacers that were tested.

915.03 Miscellaneous Hardware.

For galvanized beam guide rail, ensure that connections or splices, transition sections, nuts, bolts, washers, and plates conform to AASHTO M 180, except as follows:

(A) Parapet connection attachments and terminal end connectors

(1) If high-strength bolts are shown on the Plans, use high-strength bolts, nuts, and washers conforming to ASTM M164. Zinc coated bolts, nuts, and washers to be treated according to AASHTO M232M

(2) Use structural steel plates and shapes conforming to AASHTO M270 and galvanized per AASHTO M111.

(3) Use steel for structural tubes conforming to ASTM A500 Grade B and galvanized.

915.04 Sampling and Testing.

Samples and rate of sampling taken by the Engineer will be in accordance with AASHTO M180.

915.05 Rub Rail.

Rub rail shall be steel channels or bent plate of structural steel conforming to ASTM A709, Grade 36 and galvanized according to ASTM A 123.

Galvanized rub rail on the Garden State Parkway shall be pre-stained in accordance with Subsection 915.01.

915.06 Guide Rail Delineators.

Guide rail delineators shall be fabricated from steel sheet plates per ASTM A 6 and galvanized to AASHTO M 232. Retro reflectorized sheeting shall be per ASTM D4956, Type V Abrasive Resistant. Delineator color shall match the adjacent roadway stripe (white or yellow).

915.07 Terminals and Anchorages.

Terminals and anchorages shall be MASH compliant systems as listed on the QPL. All materials and transition components as necessary to attach to beam guide rail shall be as specified by the device manufacturer in compliance with the MASH conforming configuration.

The MASH compliant system shall conform to MASH Test Level 3 (TL-3). MASH compliance shall include a FHWA Federal Aid eligibility letter, if issued by the FHWA, and documentation of MASH compliance including crash test videos, crash test results and/or analysis. Installation and materials shall conform to the manufacturer's detailed drawings and instructions used to determine MASH compliance.

Components from multiple systems shall not be intermixed.

NOTE: The following text is ADDED to the latest version of the 2016 Standard Supplementary Specifications.

SECTION 920 – TRAFFIC CONTROL DEVICES

920.15 Temporary Impact Attenuator.

Delete the entire Subsection and replace it with the following:

Temporary Impact Attenuators shall be a MASH compliant system as listed on the QPL. All materials shall be as specified by the device manufacturer in compliance with the MASH conforming configuration.

The impact attenuator system shall conform to MASH Test Level 3 (TL-3). MASH compliance shall include a FHWA Federal Aid eligibility letter, if issued by the FHWA, and documentation of MASH compliance including crash test videos, crash test results and/or analysis. Installation and materials shall conform to the manufacturer's detailed drawings and instructions used to determine MASH compliance.

Impact attenuators used in a construction zone on a temporary basis may be either re-directive or non-redirective as indicated on the Plans. Re-directive devices shall conform to the requirements of 920.20 Redirective Impact Attenuator.

Components from multiple systems shall not be intermixed.

Sand placed in the modules should be washed concrete sand conforming to ASTM C-33 or equal.

NOTE: The following text REPLACES its respective Subsection(s) in the latest version of the 2016 Standard Supplementary Specifications.

920.18 Truck Mounted Attenuator.

Delete the Subsection and replace it with the following:

The truck mounted attenuator shall be a MASH compliant system as listed on the QPL. All materials shall be as specified by the device manufacturer in compliance with the MASH conforming configuration.

The truck mounted attenuator shall conform to MASH Test Level 3 (TL-3). MASH compliance shall include a FHWA Federal Aid eligibility letter, if issued by the FHWA, and documentation of MASH compliance including crash test videos, crash test results and/or analysis. Setup and materials shall conform to the manufacturer's detailed drawings and instructions used to determine MASH compliance.

The attenuator shall have a minimum of 72 square inches of high intensity orange retroreflective sheeting toward the extremities on each side of the equipment. A minimum of 144 square inches of the sheeting shall be visible from each direction. The rear facing of the attenuator shall have 4-inch wide black stripes on high intensity retroreflective yellow sheeting in an inverted chevron pattern. All retroreflective sheeting shall meet the requirements of ASTM D-4956, Type III. The attenuator shall have a standard trailer lighting system, including brake lights, taillights, turn signals and ICC bar lights. The truck mounted attenuator shall be attached to the truck in accordance with the manufacturer's instructions, including hydraulic tilting system and backup structures.

920.20 Re-Directive Impact Attenuator.

Delete the entire Subsection and replace it with the following:

Re-directive impact attenuators for temporary and permanent installations shall be a MASH compliant system as listed on the QPL. All materials (attenuator system, transitions, backplates, connection hardware) shall be as specified by the device manufacturer in compliance with the MASH conforming configuration.

The impact attenuator system shall be a re-directive device that conforms to MASH Test Level 3 (TL-3). MASH compliance shall include a FHWA Federal Aid eligibility letter, if issued by the FHWA, and documentation of MASH compliance including crash test videos, crash test results and/or analysis. Installation and materials shall conform to the manufacturer's detailed drawings and instructions used to determine MASH compliance.

Components from multiple systems shall not be intermixed.