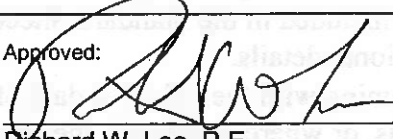


SUPERSEDED BY EB 15-031 EFFECTIVE 9/28/15		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 13-010								
Title: STANDARD SPECIFICATIONS: REVISIONS TO SECTION 606 GUIDE RAILING AND SECTIONS 710-18, 710-19 AND 710-20, AND NEW SECTION 710-28 ANCHOR BOLTS FOR GUIDE RAILING AND MEDIAN BARRIER											
Target Audience: <table border="0"> <tr> <td>☒ Manufacturers (18)</td> <td>☐ Surveyors (33)</td> </tr> <tr> <td>☒ Local Govt. (31)</td> <td>☒ Consultants (34)</td> </tr> <tr> <td>☒ Agencies (32)</td> <td>☒ Contractors (39)</td> </tr> <tr> <td></td> <td>☐ _____ ()</td> </tr> </table>		☒ Manufacturers (18)	☐ Surveyors (33)	☒ Local Govt. (31)	☒ Consultants (34)	☒ Agencies (32)	☒ Contractors (39)		☐ _____ ()	Approved:  Richard W. Lee, P.E. Acting Deputy Chief Engineer (Design) 9/23/13 Date	
☒ Manufacturers (18)	☐ Surveyors (33)										
☒ Local Govt. (31)	☒ Consultants (34)										
☒ Agencies (32)	☒ Contractors (39)										
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ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of May 8, 2014.
- This EI supersedes EI 00-040 *Transition between HPBO Corrugated Beam Guide Railing and Concrete Barrier*.
- The revisions issued with this EI will be incorporated into the next update of the Standard Specifications.

PURPOSE: The purpose of this EI is to revise the following Standard Specifications Sections:
606 *Guide Railing*

710-18 *HPBO (Mod.) Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)*
710-19 *HPBO (Mod.) Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)*
710-20 *Corrugated Beam Guide Railing and Median Barrier*
and add new section 710-28 *Anchor Bolts for Guide Railing and Median Barrier*

TECHNICAL INFORMATION:

- This EI is issued in conjunction with EB 13-028 *Standard Sheets: Heavy Post Blocked-Out, Modified Corrugated Beam Guide Railing and Median Barrier* and EI 13-011 *Special Specifications: Strong Post Corrugated Beam Guide Railing and Median Barrier*.
- The Modified Heavy Post Blocked-Out (HPBO (Mod.)) guide rail and median barrier is the adaptation of the Midwest Guardrail System (MGS) design to NYSDOT heavy post barriers and transitions. Key changes include an increase in blockout size and rail height, transitions and end terminal lengths, and a shift in the splice location. The nomenclature change is incorporated into related material sections. The associated Standard Sheets have been revised to reflect the new dimensions.
- Other changes affected by this issuance:
 - Requirements for Resetting guide rail and median barrier now include the replacement of all hardware.
 - ASTM specifications for anchor bolts have been updated and a new materials section has been added for anchor bolts, 710-28 *Anchor Bolts for Guide Railing and Median Barrier*.
 - Additional information, relating to joints and maximum barrier length, has been added to the concrete barrier Construction section.
 - Removed the reference to Material section 721-03 *Epoxy Polysulfide Grout*.
 - Added references to Section 586 *Miscellaneous Structural Reconstruction* in the Construction section.

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- Removed several work zone traffic control requirements and added references to Section 619.
- Updated requirements for resetting guide rail and median barrier, including adding a requirement to replace all hardware.
- Added pay items for anchorage units buried in back slope for both heavy and weak post corrugated-beam guide rail.
- Additional changes to the standard sheets, not directly related to HPBO changes, have been included in the Standard Sheets and the Standard Specifications. See EB 13-028 for additional details.
- Beginning with the effective date of this EI, all new runs of HPBO will utilize the new details, or where warranted, the special specification issued by EI 13-011 *Special Specifications: Strong Post Corrugated Beam Guide Railing and Median Barrier* (see below).
- **Design guidance.** The warrants for specifying HPBO (Mod.) guide rail or median barrier have not changed. However, where shoulder width is limited and the additional width of the blockout is an issue, designers should consider the use of the special specification for strong post systems issued by EI 13-011. These alternate systems are narrower and do not utilize a blockout. For design purposes, the standard deflection distance for these systems should be taken as 4 feet for the standard post spacing of 6'-3". See EI 13-011 for warrants for the use of the new strong post corrugated special specifications.
- A comparison of the anticipated standard deflection distances for HPBO (Mod.) and the former HPBO are shown in the following table:

Post Spacing	Deflection – HPBO (Mod.) 31" high	Deflection – HPBO 29" high
6' 3"	4'	47"
3' 1½"	2'-6"	24"
1' 6¾"	1'-6"	-

- **Maintenance.** When repairing damaged HPBO which had been installed at less than 29 inches high, the rail shall be repaired and reinstalled at a minimum height of 29 inches. Undamaged posts on each end of the damaged section may be raised as needed to accommodate the height change.

The decision to replace an entire rail system may be made on a case-by-case basis. If the decision is made to replace the entire run, the new installation shall be made using the HPBO (Mod.) Corrugated Guide Rail/Median Barrier details or, where applicable, the related special specifications.

- **Cost Impact.** It is anticipated that additional costs will be incurred as a result of the 50% increase in blockout size. Based on the statewide weighted average price for HPBO guide rail, designers should plan on a 5% increase in cost.

There might be additional costs due to wider widths where vegetation control strips are specified. The cost will vary depending upon type of vegetation control selected.

IMPLEMENTATION:

- **Design:** The subject Standard Specifications, related Standard Sheets and special

specifications are effective for all projects let on or after May 8, 2014. The Design Quality Assurance Bureau will insert the revisions to the Standard Specifications in applicable proposals at that time.

- The following changes will be made to the Metric and U.S. Customary Pay Item Catalog:

Disapproved U.S.C. Special Specifications:

606.31000015	Median Barrier Redirective Gating End Terminal
606.31500015	Median Barrier Redirective Gating End Terminal (Coated)
606.326xxx15	Transition - Heavy Post Blocked-Out Corrugated Beam Guide Railing - Concrete Barrier
606.46000015	Crash-Cushion Attenuating Terminal 350, CAT 350
606.46500015	Crash-Cushion Attenuating Terminal 350, CAT 350 (Rustic)
606.55000010	Resetting Heavy Post Blocked-Out Corrugated Beam Guide Railing (New Block-Outs)

Disapproved Metric Special Specifications:

606.326xxx15	Transition - Heavy Post Blocked-Out Corrugated Beam Guide Railing - Concrete Barrier
606.3401--08	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing In Rock Cuts
606.3650--08	Heavy Post Blocked-Out Corrugated Beam Guide Railing Connection to Concrete Median Barrier
606.5501--10	Retrofitting Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.9987--11	Heavy Post Blocked-Out Corrugated Beam Guiderrailing Connection to Walls (Approach Ends)

Metric and U.S. Customary item description change (item number remains unchanged):

606.27	HPBO (Mod.) Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)
606.28	HPBO (Mod.) Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)

Disapproved Specifications (Metric and U.S. Customary):

606.25	Special Anchorage Units for Corrugated Beam Median Barrier
606.32	Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.320001	Heavy Post Blocked-Out Corrugated Beam Guide Railing (Shop Curved)
606.3201	Heavy Post Blocked-Out Corrugated Beam Guide Railing With Extra Long Posts
606.320101	Heavy Post Blocked-Out Corrugated Beam Guide Railing With Extra Long Posts (Shop Curved)
606.33	Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.330001	Heavy Post Blocked-Out Corrugated Beam Median Barrier (Shop Curved)
606.34	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.35	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.4817	I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.4819	Extra Long I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.4821	I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated

	Beam Median Barrier
606.4823	Extra Long I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.55	Resetting Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.56	Resetting Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.5940	Resetting Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.5945	Resetting Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.6940	Removing and Storing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.6945	Removing and Storing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.7940	Removing and Disposing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.7945	Removing and Disposing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.8705	HPBO Corrugated Median Barrier Transition to Single Slope Concrete Median Barrier
606.8706	HPBO Corrugated Median Barrier Transition to Jersey Shape Concrete Median Barrier
606.8707	Transition Between Concrete Half Section Barrier and HPBO Corrugated Beam Guide Railing
606.89	Guide Rail Transition Box Beam to Heavy Post Blocked-Out Corrugated Beam
606.9601	Median Barrier Transition Weak-Post Corrugated Beam to Heavy Post Blocked-out Corrugated Beam

Approved Specifications (Metric and U.S. Customary):

606.2201	Anchorage Units for Corrugated Beam Guide Railing Buried In Back Slope
606.2701	HPBO (Mod.) Corrugated Beam Guide Railing
606.270101	HPBO (Mod.) Corrugated Beam Guide Railing (Shop Curved)
606.2702	HPBO (Mod.) Corrugated Beam Guide Railing with Extra Long Posts
606.270201	HPBO (Mod.) Corrugated Beam Guide Railing with Extra Long Posts (Shop Curved)
606.2703	Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing
606.2704	Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing Buried in Back Slope
606.2801	HPBO (Mod.) Corrugated Beam Median Barrier
606.280101	HPBO (Mod.) Corrugated Beam Median Barrier (Shop Curved)
606.2802	Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier
606.4818	I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Guide Railing
606.4820	Extra Long I-Beam Posts for Existing Modified HPBO Corrugated Beam Guide Railing
606.4822	I-Beam Posts for Existing HPBO Corrugated Beam Median Barrier
606.4824	Extra Long I-Beam Posts for Existing HPBO Corrugated Beam Median Barrier
606.5501	Resetting Heavy Post Blocked-Out Corrugated Beam Guide Railing

	(New 12 inch Blockouts)
606.5601	Resetting Heavy Post Blocked-Out Corrugated Beam Median Barrier (New 12 inch Blockouts)
606.58	Resetting HPBO (Mod.) Corrugated Beam Guide Railing
606.5801	Resetting HPBO (Mod.) Corrugated Beam Guide Railing (New Posts)
606.5810	Resetting HPBO (Mod.) Corrugated Beam Median Barrier
606.581001	Resetting HPBO (Mod.) Corrugated Beam Median Barrier (New Posts)
606.5941	Resetting Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing
606.5946	Resetting Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier
606.66	Removing and Storing HPBO (Mod.) Corrugated Beam Guide Railing
606.67	Removing and Storing HPBO (Mod.) Corrugated Beam Median Barrier
606.6941	Removing and Storing Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing
606.6946	Removing and Storing Anchorage Units for HPBO (Mod.) Corrugated Beam Median
606.7101	Removing and Disposing HPBO (Mod.) Corrugated Beam Guide Railing
606.7201	Removing and Disposing HPBO (Mod.) Corrugated Beam Median Barrier
606.7941	Removing and Disposing Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing
606.7946	Removing and Disposing Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier
606.8901	Transition: HPBO (Mod.) Corrugated Guide Railing to Beam Box Beam Guide Railing
606.8902	Transition: HPBO (Mod.) Corrugated Beam Guide Railing to Weak-Post Corrugated Beam Guide Railing
606.8903	Transition: HPBO (Mod.) Corrugated Beam Guide Railing to Single Slope Concrete Half Section Barrier
606.8904	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Box Beam Median Barrier
606.8905	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Weak Post Corrugated Beam Median Barrier
606.8906	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Single Slope Concrete Median Barrier

TRANSMITTED MATERIALS:

This EI transmits Standard Specification revision *Modified Heavy Post Blocked-Out, (HPBO Mod.) Corrugated Beam Guide Railing and Median Barrier.*

BACKGROUND: On May 17, 2010, the FHWA issued the memorandum HSSD, titled *Roadside Design: Steel Strong Post W-Beam Guardrail*, which revised their policy on the acceptable height of strong post w-beam barriers. That memorandum reflected the results of recent research which revealed performance issues (vehicle override) for 27 inch high heavy-post w-beam guide rail and recommended consideration of systems 31 inches high.

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To expedite compliance, NYSDOT implemented a two-phase process. The first phase instituted intermediate changes to the existing HPBO systems through EB 11-034, which increased the rail height to 29 inches, but utilized the existing 8 inch blockout. This issuance institutes Phase Two, adoption of the 31-inch Midwest Guardrail System (developed by the Midwest Roadside Safety Facility and requiring a 12-inch blockout), including conversion of all transitions.

REFERENCES: Memorandum, US Department of Transportation, Federal Highway Administration - Subject: *ACTION: Roadside Design: Steel Strong Post W-beam Guardrail* available at:
http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/policy_memo/memo051710/
Midwest Roadside Safety Facility, Midwest Guardrail System:
<http://engineering.unl.edu/specialty-units/mwrsf/Newsletter-MidwestGuardrail.shtml>

CONTACT: Direct questions regarding this EI to Robert Lohse of the Design Quality Assurance Bureau at (518) 457-3528 or by email at robert.lohse@dot.ny.gov.

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

Make the following changes to the Standard Specifications dated May 1, 2008 as modified by EI 12-007:

Change the Section 606 title to **"SECTION 606 – GUIDE RAILING, MEDIAN BARRIER, AND CONCRETE BARRIER"**

Under 606-1 *DESCRIPTION*, **replace**: "Heavy Post Blocked-out (HPBO) Corrugated Beam Guide Railing and Median Barrier" with "Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier"

Under 606-2 *MATERIALS*, *Section 700 list*:

Add "Anchoring Materials-Chemically Curing, 701-07" and "Anchor Bolts for Guide Railing, 710-28"

Delete "Epoxy Polysulfide Grout, 721-03" and "Anchor Bolts, 723-60".

Change the name of 710-18 to "HPBO (Mod.) Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)"

Change the name of 710-19 to "HPBO (Mod.) Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)"

Delete 606-2.02 *Anchor Bolts and Studs* in its entirety and **Replace** with:

"606-2.02 Anchor Bolts. For the purpose of the guide railing specifications, the term anchor bolt will be used when referring to anchor rods, hooks, or studs.

Unless otherwise specified, anchor bolts embedded or grouted in concrete for securing post and railing base plates, or transitioning to concrete walls, parapets, and barriers shall meet the requirements of §710-28.

Anchor bolts embedded in concrete anchorage units for terminating guide rail and median barrier systems shall have minimum yield and tensile strength meeting the requirements of ASTM F1554 Grade 36.

Anchor bolts, nuts, and washers shall be galvanized in accordance with §719-01, Galvanized Coatings and Repair Methods, Type II, unless indicated otherwise on the plans or Standard Sheets.

Grout for anchor bolts shall conform to the requirements of §701-07 or §701-05."

In 606-2.03 *Fasteners*, **Replace** "Bolts ASTM A307 Grade A" with:
"Bolts ASTM F1554 Grade 36".

Delete 606-2.05, in its entirety and **Replace** with:

"606-2.05 Extra Long Guide Rail Posts. Extra long Guide Rail Posts shall conform to the requirements of §710-14 Galvanized Steel Barrier Posts. The posts shall conform to the details for extra long posts shown on the standard sheets or plans."

In 606-2.08 **add** the following sentence to the end of the paragraph: "HPBO guide railing and median barrier (pre-2013 design) shall be reset as detailed in the current standard sheets, including 12 inch block-outs."

Delete 606-2.09 in its entirety and **Replace** with:

"606-2.09 HPBO (Mod.) Corrugated Beam Guide Railing and Median Barrier. The material requirements of §710-20 Corrugated Beam Guide Railing and Median Barrier shall apply except that posts, block-outs, soil plates, anchor bolts, hardware, and fasteners shall be as detailed on the Standard Sheets. The Wood and Timber Posts and Timber Block-Outs shall conform to §710-13. The Plastic and Synthetic Block-Outs for Heavy Post Guiderrail Systems shall conform to §710-26."

In 606-2.10 *Corrugated Beam Guide Rail Transition to Bridge Rail, Concrete Barrier, and*

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

Concrete Parapets, **add** the following to the end of the first sentence:

"and as detailed on the Standard Sheets or Bridge Detail Sheets. Thrie beam shall conform to the material specifications of 710-20 and shall be as detailed on the Standard Sheets."

Replace 606-2.10A with:

"606-2.10A. Steel tubular block-outs and stiffening channels, where specified, shall conform to ASTM A36."

In 606-3.01D. *Erection*, **replace** the first two paragraphs with:

"Posts, railing, barrier systems, rail transitions, end assemblies, and anchorage units shall be erected as specified in the contract plans or manufacturer's drawings. Where drilling and grouting is required, Section 586 – *Miscellaneous Structural Reconstruction* shall apply, unless otherwise approved. Rail mounting height shall be within +/- 1/4 inch of that indicated on the Standard Sheets and plans.

Prior to installing guide rail, median barrier, transitions, or end terminals, the Contractor shall determine the locations of all structures, including underground structures, that may be affected by the installation. If there are conflicts between the proposed installation and other structures, the Contractor shall discuss with and recommend to the Engineer alternative locations or types of barrier, transitions, or end terminals that will not be in conflict with the structure."

In 606-3.01D. *Erection*, **replace** the fifth paragraph with:

"On structures, concrete anchors, and paved medians, base plates for posts shall be anchored as shown in the Contract Documents. Alternate construction methods and equipment for drilling and grouting of holes shall be submitted to the Engineer for approval before operations begin."

In 606-3.01F. *End Terminals and Assemblies*, **replace** bullet "4. *Traffic Protection*." with:
"**4. Traffic Protection.** Traffic protection shall be provided as specified in Section 619 *Work Zone Traffic Control*."

In 606-3.03 *Box Beam Guide Railing and Median Barrier*, **delete** the 2nd paragraph.

In 606-3.04, **change** the title to "**Weak Post and HPBO (Mod.) Corrugated Beam Guide Railing and Median Barrier**"

In 606-3.04, **replace** the 2nd paragraph with "Rail splicing shall be as shown on the Standard Sheets."

In 606-3.04 A., **change** the title to "**Weak Post Corrugated Beam Guide Railing and Median Barrier.**"

Replace 606-3.04B with:

"**B. HPBO (Mod.) Corrugated Beam Guide Railing and Median Barrier.** HPBO (Mod.) guide railing shall be erected from the approach-end anchorage unit and downstream along the flow of traffic.

HPBO (Mod.) median barrier shall be erected from one of the anchorage sections and shall be completed as the work progresses.

HPBO (Mod.) guide railing and median barrier connections to walls or Concrete Barriers shall be as specified on the plans or the Standard Sheets.

During non-working hours, no uncompleted anchorage units or heavy posts without rail will be permitted to be exposed to traffic on either guide railing or median barrier."

In 606-3.05 *Concrete Barrier*, **delete** the 2nd paragraph and **replace** with:

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

"Unless otherwise specified, excavation shall be performed in accordance with §206-3. Granular back fill shall conform to Section 304 and shall match the subbase course type used on the adjacent roadway.

Half section concrete barrier shall be erected with the appropriate back-up posts and continuity plates as shown on the Standard Sheets and plans."

In 606-3.05 *Concrete Barrier, A. Precast Concrete Barrier*, **add** a 4th bullet:

"4. Placement Adjacent to Cement Concrete. The barrier shall be separated from cement concrete pavement or shoulders by a $\frac{1}{2}$ " thick ($\pm \frac{1}{8}$ "") premoulded resilient joint filler meeting §705-07. The joint filler shall cover the entire pavement/shoulder face. A joint sealant reservoir $\frac{1}{4}$ " - $\frac{1}{2}$ " deep shall be formed or routed in the joint filler. The Contractor shall abrasive blast the barrier and pavement/shoulder in the reservoir, and seal the joint using material meeting §705-02, Highway Joint Sealant, Type IV. Sealing shall be done in accordance with the manufacturer's instructions, a copy of which shall be provided to the Engineer prior to commencement of work."

In 606-3.05 *Concrete Barrier, B. Cast-in-Place Concrete Barrier*, **replace** bullet numbers 1. and 2. with:

"1. Placing. Cast-in-place concrete barriers and footings shall not extend more than 200 feet without an expansion joint. The Contractor shall have the option of placing the cast-in-place concrete barrier with a monolithic cross-section or with a horizontal construction joint at the top of the footing. When the Contractor elects to cast a separate footing, the horizontal joint details must conform to those on the Standard Sheets or in the plans, or the Contractor must prepare joint details and submit them to the Regional Director for approval.

2. Joints

- a. *Contraction Joints.* Cast-in-place concrete barrier shall have contraction joints every 20 feet in both the footing and the stem. When cast separately, the joints in the stem shall line up with the joints in the footing. Contraction joints shall be formed in or saw cut normal to the pavement. The joints shall conform to the dimensions as shown on the plans or Standard Sheets. If the joints are saw cut, they shall be saw cut as soon as no damage to the concrete will result, with a maximum time of 2 hours after the forms are removed to avoid early formation of uncontrolled shrinkage cracks. Clear curing compound shall be promptly applied to the saw cut.
- b. *Expansion Joints.* Expansion joints shall be formed normal to the pavement with Premoulded Resilient Joint Filler meeting the requirements of §705-07 and shall provide for expansion of $\frac{1}{2}$ inch. The filler material shall be cut to fully cover and conform to the cross section of the barrier, or to the footer and stem separately if they are cast separately.

In addition to the maximum separation of 200 feet, expansion joints shall be located at all immovable objects (bridge substructures, etc.), where shown on the plans, and/or as directed by the Engineer.

- c. *Construction Joints.* When the Contractor's operations require the use of a construction joint, one of the two following procedures may be used. However, if operations will not resume within 24 hours, only method A may be used.

Method A. Construct an expansion joint as detailed in the preceding section.

Method B. After initial set has taken place, remove the end form to expose the concrete. Roughen the surface to achieve a good interlock and increased bond area when the concrete operations are resumed. A one-inch strip around the periphery of the end surface should remain undisturbed to serve as a neat, linear contraction joint. The end surface shall be covered with several layers of wetted burlap to prevent drying. All reinforcing steel shall extend beyond the face to provide adequate lapping."

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

In 606-3.05 *Concrete Barrier, B. Cast-in-Place Concrete Barrier*, **replace** bullet number 6, *Concrete Curing* with:

"6. Curing. The median barrier shall be cured using a clear curing compound meeting the requirements of §711-05. The compound shall be sprayed on the concrete surfaces at a rate of 1 gal/ 150 sf within one hour of form removal."

In 606-3.05 *Concrete Barrier, C. Machine Formed Concrete Barrier*, **Insert** the following as the first sentence under bullet number 9. *Expansion Joints*:

"Machine formed concrete barriers shall not extend more than 400 feet without an expansion joint."

Delete 606-3.06 in its entirety and **replace** with:

"606-3.06 Resetting Guide Railing, Median Barrier and Precast Concrete Barrier. The Contractor shall remove, store, clean and reset railing, posts, and precast concrete barrier as shown on the plans or as directed by the Engineer. The Contractor shall remove designated existing guide railing, median barrier and precast concrete barrier and neatly store them at locations approved by the Engineer. The work shall be done in a workmanlike manner so as to salvage all usable parts. The reset guide railing and/or median barrier shall be placed in accordance with the requirements of §606-3.01 General and the subsection for each specific system. Unless otherwise specified by the designer, all existing hardware, i.e., post bolts, J-bolts, splice bolts, etc., shall be replaced with new hardware.

Cable systems shall be retensioned and all existing splice couplings and wedges shall be replaced.

HPBO guide railing and median barrier (pre-2013 design) shall be reset as detailed in the current standard sheets, including 12 inch block-outs. The existing block-outs shall become the property of the Contractor."

Delete 606-3.07 in its entirety and **replace** with: **"606-3.07 Resetting Guide Railing and Median Barrier (New Posts).** The construction details of §606-3.06 shall apply, except that the Contractor shall furnish and install new posts and remove the old posts from the site."

Delete 606-3.10 in its entirety and **replace** with:

"606-3.10 I-Beam Posts for Existing Highway Barrier. I-beam posts for existing highway barrier shall be installed at the locations indicated in the contract documents or where directed by the Engineer. The driving shall be in accordance with the requirements of §606-3.01 and the applicable standard sheet(s). All hardware necessary for mounting the rail elements or cable to the post shall be supplied by the Contractor. New heavy post block-outs shall be supplied to replace damaged or unusable block-outs. S3x5.7 posts installed as intermediate posts to reduce post spacing on weak post corrugated beam guide railing and median barrier and on box beam guide railing shall not be attached to the rail element.

All reflectors, delineators, reference markers, or other items, which are to remain in place, that are damaged by or during the Contractor's operations shall be replaced by the Contractor."

Delete 606-3.14 in its entirety and **replace** with:

"606-3.14 Removing and Disposing Anchorage Unit Assemblies and End Assemblies for Guide Railing and Median Barriers. The construction details of §606-3.13 shall apply except the Contractor shall remove the Anchorage Unit Assemblies and End Assemblies from the site."

In 606-4.02 **Anchorage Units, End Assemblies and Transitions for Guide Railing or Median Barrier:**

In the 4th and 5th paragraphs, **replace** "HPBO Corrugated Beam" with "HPBO (Mod.) Corrugated Beam"

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

Delete 606-4.12 in its entirety and **replace** with:
"606-4.12 Vacant"

In 606-4.17, Table 606-2 **replace** *Heavy Post Blocked Out Corrugated Beam* with "HPBO (Mod.) Corrugated Beam"

In 606-5.03 *Resetting; Removing and Storing; Removing and Disposing; of Guide Railing, Median Barrier and Concrete Barrier*, **replace** the first sentence with:

"The unit price bid per foot for the above work items shall include the cost of furnishing all labor, equipment and materials necessary to complete the work and restore the system to full operating capacity."

Delete 606-5.06 in its entirety and **replace** with: **"606-5.06 Vacant"**

Under "Payment will be made under:" **change** the description of the following items:

- Item 606.27 **change** "Heavy Post Blocked-Out Corrugated Beam Guide Railing End Terminal" to "HPBO (Mod.) Corrugated Beam Guide Railing End Terminal"
- Item 606.28 **change** "Heavy Post Blocked-Out Corrugated Beam Median Barrier End Terminal" to "HPBO (Mod.) Corrugated Beam Median Barrier End Terminal"

Under "Payment will be made under:" **delete** the following items:

606.25	Special Anchorage Units for Corrugated Beam Median Barrier
606.32	Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.320001	Heavy Post Blocked-Out Corrugated Beam Guide Railing (Shop Curved)
606.3201	Heavy Post Blocked-Out Corrugated Beam Guide Railing with Extra Long Posts
606.320101	Heavy Post Blocked-Out Corrugated Beam Guide Railing with Extra Long Posts (Shop Curved)
606.33	Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.330001	Heavy Post Blocked-Out Corrugated Beam Median Barrier (Shop Curved)
606.34	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.35	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.4817	I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.4819	Extra Long I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.4821	I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.4823	Extra Long I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.55	Resetting Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.56	Resetting Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.5940	Resetting Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.5945	Resetting Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

606.6940	Removing and Storing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.6945	Removing and Storing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.7940	Removing and Disposing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.7945	Removing and Disposing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.8705	HPBO Corrugated Median Barrier Transition to Single Slope Concrete Median Barrier
606.8706	HPBO Corrugated Median Barrier Transition to Jersey Shape Concrete Median Barrier
606.8707	Transition Between Concrete Half Section Barrier and HPBO Corrugated Beam Guide Railing
606.89	Guide Rail Transition Box Beam to Heavy Post Blocked-Out Corrugated Beam
606.9601	Median Barrier Transition Weak-Post Corrugated Beam to Heavy Post Blocked-out Corrugated Beam

Under "Payment will be made under:" **add** the following items:

Item No.	Item	Pay Unit
606.2201	Anchorage Units for Corrugated Beam Guide Railing Buried In Back Slope	Each
606.2701	HPBO (Mod.) Corrugated Beam Guide Railing	Foot
606.270101	HPBO (Mod.) Corrugated Beam Guide Railing (Shop Curved)	Foot
606.2702	HPBO (Mod.) Corrugated Beam Guide Railing with Extra Long Posts	Foot
606.270201	HPBO (Mod.) Corrugated Beam Guide Railing with Extra Long Posts (Shop Curved)	Foot
606.2703	Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.2704	Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing Buried in Back Slope	Each
606.2801	HPBO (Mod.) Corrugated Beam Median Barrier	Foot
606.280101	HPBO (Mod.) Corrugated Beam Median Barrier (Shop Curved)	Foot
606.2802	Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.4818	I-Beam posts for Existing HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.4820	Extra Long I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.4822	I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.4824	Extra Long I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.5501	Resetting HPBO Corrugated Beam Guide Railing (New 12 inch Blockouts)	Foot
606.5601	Resetting HPBO Corrugated Beam Median Barrier (New 12 inch Blockouts)	Foot

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

606.58	Resetting HPBO (Mod.) Corrugated Beam Guide Railing	Foot
606.5801	Resetting HPBO (Mod.) Corrugated Beam Guide Railing (New Posts)	Foot
606.5810	Resetting HPBO (Mod.) Corrugated Beam Median Barrier	Foot
606.581001	Resetting HPBO (Mod.) Corrugated Beam Median Barrier (New Posts)	Foot
606.5941	Resetting Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.5946	Resetting Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.66	Removing and Storing HPBO (Mod.) Corrugated Beam Guide Railing	Foot
606.67	Removing and Storing HPBO (Mod.) Corrugated Beam Median Barrier	Foot
606.6941	Removing and Storing Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.6946	Removing and Storing Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.7101	Removing and Disposing HPBO (Mod.) Corrugated Beam Guide Railing	Foot
606.7201	Removing and Disposing HPBO (Mod.) Corrugated Beam Median Barrier	Foot
606.7941	Removing and Disposing Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.7946	Removing and Disposing Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.8901	Transition: HPBO (Mod.) Corrugated Guide Railing to Beam Box Beam Guide Railing	Each
606.8902	Transition: HPBO (Mod.) Corrugated Beam Guide Railing to Weak Post Corrugated Beam Guide Railing	Each
606.8903	Transition: HPBO (Mod.) Corrugated Beam Guide Railing to Single Slope Concrete Half Section Barrier	Each
606.8904	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Beam Box Beam Median Barrier	Each
606.8905	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Weak Post Corrugated Beam Median Barrier	Each
606.8906	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Single Slope Concrete Median Barrier	Each

In 710-18, **change** the title to **"HPBO (Mod.) CORRUGATED BEAM GUIDE RAILING END TERMINAL (ENERGY ABSORBING)"**

In 710-18, **SCOPE**, and **BASIS OF ACCEPTANCE**, **change**:

"HPBO Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)" to
 "HPBO (Mod.) Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)"

In 710-19, **change** the title to **"HPBO (Mod.) CORRUGATED BEAM MEDIAN BARRIER END TERMINAL (ENERGY ABSORBING)"**

In 710-19, **SCOPE**, and **BASIS OF ACCEPTANCE** **change**:

"HPBO Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)" to

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

"HPBO (Mod.) Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)"

In 710-20, **delete** the section "Splices" in its entirety and **replace** with:

"Splices and Post Bolts. Splices and post bolts shall be made with flat, roundheaded, grippable, galvanized bolts, nuts, and washers conforming to the following, unless specified otherwise in the contract documents: Bolts ASTM F1554 Grade 36, Nuts ASTM A563 Grade A or better, and Washers ASTM F844. They shall be galvanized in accordance with the requirements of §719-01 Galvanized Coatings and Repair Methods, Type II (ASTM A153) unless another coating is specified.

Post bolts and the splice bolts shall be as detailed on the Standard Sheets."

Delete "710-28 THRU 710-29 (VACANT)" in its entirety and **replace** with:

"710-28 ANCHOR BOLTS FOR GUIDE RAILING AND MEDIAN BARRIER

SCOPE. This specification covers the material requirements for anchor bolts.

MATERIALS REQUIREMENTS. Anchor bolts shall meet the requirements of ASTM A449. A hex nut and flat washer shall be supplied with each anchor bolt and their dimensions shall be as shown on the plans or Standard Sheets. The hex nut and flat washer shall be manufactured in accordance with ASTM A325. The nuts, washers, and the top 12 inches of the anchor bolts shall be galvanized in accordance with the requirements for Type II or Type V galvanizing as stated in section §719-01, Galvanized Coatings and Repair Methods. The anchor bolt, nut and washer dimensions shall be as shown on the plans or Standard Sheets.

SHIPPING. Anchor bolts, hex nuts, and washers shall be shipped to the construction site at a time convenient to the masonry construction.

BASIS OF ACCEPTANCE. Anchor bolts will be accepted upon the manufacturer's certification that they meet the requirements of this section.

710-29 (VACANT)"

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

Make the following changes to the Standard Specifications dated May 4, 2006 as modified by EI 12-007:

Change the Section 606 title to **"SECTION 606 – GUIDE RAILING, MEDIAN BARRIER, AND CONCRETE BARRIER"**

Under 606-1 *DESCRIPTION*, **replace**: "*Heavy Post Blocked-out (HPBO) Corrugated Beam Guide Railing and Median Barrier*" with "*Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier*"

Under 606-2 *MATERIALS*, *Section 700 list*:

Add "Anchoring Materials-Chemically Curing, 701-07" and "Anchor Bolts for Guide Railing, 710-28"

Delete "Epoxy Polysulfide Grout, 721-03" and "Anchor Bolts, 723-60".

Change the name of 710-18 to "HPBO (Mod.) Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)"

Change the name of 710-19 to "HPBO (Mod.) Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)"

Delete 606-2.02 *Anchor Bolts and Studs* in its entirety and **replace** with:

"606-2.02 Anchor Bolts. For the purpose of the guide railing specifications, the term anchor bolt will be used when referring to anchor rods, hooks, or studs.

Unless otherwise specified, anchor bolts embedded or grouted in concrete for securing post and railing base plates, or transitioning to concrete walls, parapets, and barriers shall meet the requirements of §710-28.

Anchor bolts embedded in concrete anchorage units for terminating guide rail and median barrier systems shall have minimum yield and tensile strength meeting the requirements of ASTM F1554 Grade 36.

Anchor bolts, nuts, and washers shall be galvanized in accordance with §719-01, Galvanized Coatings and Repair Methods, Type II, unless indicated otherwise on the plans or Standard Sheets.

Grout for anchor bolts shall conform to the requirements of §701-07 or §701-05."

In 606-2.03 *Fasteners*, **replace** "Bolts ASTM A307 Grade A" with:
"Bolts ASTM F1554 Grade 36".

Delete 606-2.05, in its entirety and **replace** with:

"606-2.05 Extra Long Guide Rail Posts. Extra long Guide Rail Posts shall conform to the requirements of §710-14 Galvanized Steel Barrier Posts. The posts shall conform to the details for extra long posts shown on the standard sheets or plans."

In 606-2.08 **add** the following sentence to the end of the paragraph: "HPBO guide railing and median barrier (pre-2013 design) shall be reset as detailed in the current standard sheets, including 305 mm block-outs."

Delete 606-2.09 in its entirety and **replace** with:

"606-2.09 HPBO (Mod.) Corrugated Beam Guide Railing and Median Barrier. The material requirements of §710-20 Corrugated Beam Guide Railing and Median Barrier shall apply except that posts, block-outs, soil plates, anchor bolts, hardware, and fasteners shall be as detailed on the Standard Sheets. The Wood and Timber Posts and Timber Block-Outs shall conform to §710-13. The Plastic and Synthetic Block-Outs for Heavy Post Guiderail Systems shall conform to §710-26."

In 606-2.10 *Corrugated Beam Guide Rail Transition to Bridge Rail, Concrete Barrier, and*

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

Concrete Parapets, **add** the following to the end of the first sentence:

"and as detailed on the Standard Sheets or Bridge Detail Sheets. Thrie beam shall conform to the material specifications of 710-20 and shall be as detailed on the Standard Sheets."

Replace 606-2.10A with:

"606-2.10A. Steel tubular block-outs and stiffening channels, where specified, shall conform to ASTM A36."

In 606-3.01D. **Erection**, **replace** the first two paragraphs with:

"Posts, railing, barrier systems, rail transitions, end assemblies, and anchorage units shall be erected as specified in the contract plans or manufacturer's drawings. Where drilling and grouting is required, Section 586 – *Miscellaneous Structural Reconstruction* shall apply, unless otherwise approved. Rail mounting height shall be within +/- 6 mm of that indicated on the Standard Sheets and plans.

Prior to installing guide rail, median barrier, transitions, or end terminals, the Contractor shall determine the locations of all structures, including underground structures, that may be affected by the installation. If there are conflicts between the proposed installation and other structures, the Contractor shall discuss with and recommend to the Engineer alternative locations or types of barrier, transitions, or end terminals that will not be in conflict with the structure."

In 606-3.01D. **Erection**, **replace** the fifth paragraph with:

"On structures, concrete anchors, and paved medians, base plates for posts shall be anchored as shown in the Contract Documents. Alternate construction methods and equipment for drilling and grouting of holes shall be submitted to the Engineer for approval before operations begin."

In 606-3.01F. **End Terminals and Assemblies**, **replace** bullet "4. *Traffic Protection*." with:

"4. Traffic Protection. Traffic protection shall be provided as specified in Section 619 *Work Zone Traffic Control*."

In 606-3.03 **Box Beam Guide Railing and Median Barrier**, **delete** the 2nd paragraph.

In 606-3.04, **change** the title to "**Weak Post and HPBO (Mod.) Corrugated Beam Guide Railing and Median Barrier**"

In 606-3.04, **replace** the 2nd paragraph with "Rail splicing shall be as shown on the Standard Sheets."

In 606-3.04 A., **change** the title to "**Weak Post Corrugated Beam Guide Railing and Median Barrier.**"

Replace 606-3.04B with:

"B. HPBO (Mod.) Corrugated Beam Guide Railing and Median Barrier. HPBO (Mod.) guide railing shall be erected from the approach-end anchorage unit and downstream along the flow of traffic.

HPBO (Mod.) median barrier shall be erected from one of the anchorage sections and shall be completed as the work progresses.

HPBO (Mod.) guide railing and median barrier connections to walls or Concrete Barriers shall be as specified on the plans or the Standard Sheets.

During non-working hours, no uncompleted anchorage units or heavy posts without rail will be permitted to be exposed to traffic on either guide railing or median barrier."

In 606-3.05 **Concrete Barrier**, **delete** the 2nd paragraph and **replace** with:

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

"Unless otherwise specified, excavation shall be performed in accordance with §206-3. Granular back fill shall conform to Section 304 and shall match the subbase course type used on the adjacent roadway.

Half section concrete barrier shall be erected with the appropriate back-up posts and continuity plates as shown on the Standard Sheets and plans."

In 606-3.05 *Concrete Barrier, A. Precast Concrete Barrier*, **add** a 4th bullet:

"4. Placement Adjacent to Cement Concrete. The barrier shall be separated from cement concrete pavement or shoulders by a 13 mm thick (± 3 mm) premoulded resilient joint filler meeting §705-07. The joint filler shall cover the entire pavement/shoulder face. A joint sealant reservoir 6 – 13 mm deep shall be formed or routed in the joint filler. The Contractor shall abrasive blast the barrier and pavement/shoulder in the reservoir, and seal the joint using material meeting §705-02, Highway Joint Sealant, Type IV. Sealing shall be done in accordance with the manufacturer's instructions, a copy of which shall be provided to the Engineer prior to commencement of work."

In 606-3.05 *Concrete Barrier, B. Cast-in-Place Concrete Barrier*, **replace** bullet numbers 1. and 2. with:

"1. Placing. Cast-in-place concrete barriers and footings shall not extend more than 60 m without an expansion joint. The Contractor shall have the option of placing the cast-in-place concrete barrier with a monolithic cross-section or with a horizontal construction joint at the top of the footing. When the Contractor elects to cast a separate footing, the horizontal joint details must conform to those on the Standard Sheets or in the plans, or the Contractor must prepare joint details and submit them to the Regional Director for approval.

2. Joints

- a. *Contraction Joints.* Cast-in-place concrete barrier shall have contraction joints every 6.0 m in both the footing and the stem. When cast separately, the joints in the stem shall line up with the joints in the footing. Contraction joints shall be formed in or saw cut normal to the pavement. The joints shall conform to the dimensions as shown on the plans or Standard Sheets. If the joints are saw cut, they shall be saw cut as soon as no damage to the concrete will result, with a maximum time of 2 hours after the forms are removed to avoid early formation of uncontrolled shrinkage cracks. Clear curing compound shall be promptly applied to the saw cut.
- b. *Expansion Joints.* Expansion joints shall be formed normal to the pavement with Premoulded Resilient Joint Filler meeting the requirements of §705-07 and shall provide for expansion of 13 mm. The filler material shall be cut to fully cover and conform to the cross section of the barrier, or to the footer and stem separately if they are cast separately.

In addition to the maximum separation of 60 m, expansion joints shall be located at all immovable objects (bridge substructures, etc.), where shown on the plans, and/or as directed by the Engineer.

- c. *Construction Joints.* When the Contractor's operations require the use of a construction joint, one of the two following procedures may be used. However, if operations will not resume within 24 hours, only method A may be used.

Method A. Construct an expansion joint as detailed in the preceding section.

Method B. After initial set has taken place, remove the end form to expose the concrete. Roughen the surface to achieve a good interlock and increased bond area when the concrete operations are resumed. A 25 mm strip around the periphery of the end surface should remain undisturbed to serve as a neat, linear contraction joint. The end surface shall be covered with several layers of wetted burlap to prevent drying. All reinforcing steel shall extend beyond the face to provide adequate lapping."

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

In 606-3.05 *Concrete Barrier, B. Cast-in-Place Concrete Barrier.*, **replace** bullet number 6, *Concrete Curing* with:

“6. Curing. The median barrier shall be cured using a clear curing compound meeting the requirements of §711-05. The compound shall be sprayed on the concrete surfaces at a rate of 0.27 l/m² within one hour of form removal.”

In 606-3.05 *Concrete Barrier, C. Machine Formed Concrete Barrier.*, **Insert** the following as the first sentence under bullet number 9. *Expansion Joints*:

“Machine formed concrete barriers shall not extend more than 120 m without an expansion joint.”

Delete 606-3.06 in its entirety and **replace** with:

“606-3.06 Resetting Guide Railing, Median Barrier and Precast Concrete Barrier. The Contractor shall remove, store, clean and reset railing, posts, and precast concrete barrier as shown on the plans or as directed by the Engineer. The Contractor shall remove designated existing guide railing, median barrier and precast concrete barrier and neatly store them at locations approved by the Engineer. The work shall be done in a workmanlike manner so as to salvage all usable parts. The reset guide railing and/or median barrier shall be placed in accordance with the requirements of §606-3.01 General and the subsection for each specific system. Unless otherwise specified by the designer, all existing hardware, i.e., post bolts, J-bolts, splice bolts, etc., shall be replaced with new hardware.

Cable systems shall be retensioned and all existing splice couplings and wedges shall be replaced.

HPBO guide railing and median barrier (pre-2013 design) shall be reset as detailed in the current standard sheets, including 305 mm block-outs. The existing block-outs shall become the property of the Contractor”

Delete 606-3.07 in its entirety and **replace** with: **“606-3.07 Resetting Guide Railing and Median Barrier (New Posts).** The construction details of §606-3.06 shall apply, except that the Contractor shall furnish and install new posts and remove the old posts from the site.”

Delete 606-3.10 in its entirety and **replace** with:

“606-3.10 I-Beam Posts for Existing Highway Barrier. I-beam posts for existing highway barrier shall be installed at the locations indicated in the contract documents or where directed by the Engineer. The driving shall be in accordance with the requirements of §606-3.01 and the applicable standard sheet(s). All hardware necessary for mounting the rail elements or cable to the post shall be supplied by the Contractor. New heavy post block-outs shall be supplied to replace damaged or unusable block-outs. S75x8.5 posts installed as intermediate posts to reduce post spacing on weak post corrugated beam guide railing and median barrier and on box beam guide railing shall not be attached to the rail element.

All reflectors, delineators, reference markers, or other items, which are to remain in place, that are damaged by or during the Contractor's operations shall be replaced by the Contractor.”

Delete 606-3.14 in its entirety and **replace** with:

“606-3.14 Removing and Disposing Anchorage Unit Assemblies and End Assemblies for Guide Railing and Median Barriers. The construction details of §606-3.13 shall apply except the Contractor shall remove the Anchorage Unit Assemblies and End Assemblies from the site.”

In 606-4.02 **Anchorage Units, End Assemblies and Transitions for Guide Railing or Median Barrier.:**

In the 4th and 5th paragraphs, **replace** “HPBO Corrugated Beam” with “HPBO (Mod.) Corrugated Beam”

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

Delete 606-4.12 in its entirety and **replace** with:
"606-4.12 Vacant"

In 606-4.17, Table 606-2 **replace** *Heavy Post Blocked Out Corrugated Beam* with "HPBO (Mod.) Corrugated Beam"

In 606-5.03 *Resetting; Removing and Storing; Removing and Disposing; of Guide Railing, Median Barrier and Concrete Barrier*, **replace** the first sentence with:
"The unit price bid per foot for the above work items shall include the cost of furnishing all labor, equipment and materials necessary to complete the work and restore the system to full operating capacity."

Delete 606-5.06 in its entirety and **replace** with: "606-5.06 Vacant"

Under "Payment will be made under:" **change** the description of the following items:

- Item 606.27 **change** "Heavy Post Blocked-Out Corrugated Beam Guide Railing End Terminal" to "HPBO (Mod.) Corrugated Beam Guide Railing End Terminal"
- Item 606.28 **change** "Heavy Post Blocked-Out Corrugated Beam Median Barrier End Terminal" to "HPBO (Mod.) Corrugated Beam Median Barrier End Terminal"

Under "Payment will be made under:" **delete** the following items:

606.25	Special Anchorage Units for Corrugated Beam Median Barrier
606.32	Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.320001	Heavy Post Blocked-Out Corrugated Beam Guide Railing (Shop Curved)
606.3201	Heavy Post Blocked-Out Corrugated Beam Guide Railing With Extra Long Posts
606.320101	Heavy Post Blocked-Out Corrugated Beam Guide Railing With Extra Long Posts (Shop Curved)
606.33	Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.330001	Heavy Post Blocked-Out Corrugated Beam Median Barrier (Shop Curved)
606.34	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.35	Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.4817	I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.4819	Extra Long I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.4821	I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.4823	Extra Long I-Beam Posts for Existing Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.55	Resetting Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.56	Resetting Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.5940	Resetting Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.5945	Resetting Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

606.6940	Removing and Storing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.6945	Removing and Storing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.7940	Removing and Disposing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Guide Railing
606.7945	Removing and Disposing Anchorage Units for Heavy Post Blocked-Out Corrugated Beam Median Barrier
606.8705	HPBO Corrugated Median Barrier Transition to Single Slope Concrete Median Barrier
606.8706	HPBO Corrugated Median Barrier Transition to Jersey Shape Concrete Median Barrier
606.8707	Transition Between Concrete Half Section Barrier and HPBO Corrugated Beam Guide Railing
606.89	Guide Rail Transition Box Beam to Heavy Post Blocked-Out Corrugated Beam
606.9601	Median Barrier Transition Weak-Post Corrugated Beam to Heavy Post Blocked-out Corrugated Beam

Under "Payment will be made under:" **add** the following items:

Item No.	Item	Pay Unit
606.2201	Anchorage Units for Corrugated Beam Guide Railing Buried In Back Slope	Each
606.2701	HPBO (Mod.) Corrugated Beam Guide Railing	Meter
606.270101	HPBO (Mod.) Corrugated Beam Guide Railing (Shop Curved)	Meter
606.2702	HPBO (Mod.) Corrugated Beam Guide Railing with Extra Long Posts	Meter
606.270201	HPBO (Mod.) Corrugated Beam Guide Railing with Extra Long Posts (Shop Curved)	Meter
606.2703	Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.2704	Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing Buried in Back Slope	Each
606.2801	HPBO (Mod.) Corrugated Beam Median Barrier	Meter
606.280101	HPBO (Mod.) Corrugated Beam Median Barrier (Shop Curved)	Meter
606.2802	Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.4818	I-Beam posts for Existing HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.4820	Extra Long I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.4822	I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.4824	Extra Long I-Beam Posts for Existing HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.5501	Resetting HPBO Corrugated Beam Guide Railing (New 305 mm Blockouts)	Meter
606.5601	Resetting HPBO Corrugated Beam Median Barrier (New 305 mm Blockouts)	Meter

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

606.58	Resetting HPBO (Mod.) Corrugated Beam Guide Railing	Meter
606.5801	Resetting HPBO (Mod.) Corrugated Beam Guide Railing (New Posts)	Meter
606.5810	Resetting HPBO (Mod.) Corrugated Beam Median Barrier	Meter
606.581001	Resetting HPBO (Mod.) Corrugated Beam Median Barrier (New Posts)	Meter
606.5941	Resetting Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.5946	Resetting Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.66	Removing and Storing HPBO (Mod.) Corrugated Beam Guide Railing	Meter
606.67	Removing and Storing HPBO (Mod.) Corrugated Beam Median Barrier	Meter
606.6941	Removing and Storing Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.6946	Removing and Storing Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.7101	Removing and Disposing HPBO (Mod.) Corrugated Beam Guide Railing	Meter
606.7201	Removing and Disposing HPBO (Mod.) Corrugated Beam Median Barrier	Meter
606.7941	Removing and Disposing Anchorage Units for HPBO (Mod.) Corrugated Beam Guide Railing	Each
606.7946	Removing and Disposing Anchorage Units for HPBO (Mod.) Corrugated Beam Median Barrier	Each
606.8901	Transition: HPBO (Mod.) Corrugated Guide Railing to Beam Box Beam Guide Railing	Each
606.8902	Transition: HPBO (Mod.) Corrugated Beam Guide Railing to Weak Post Corrugated Beam Guide Railing	Each
606.8903	Transition: HPBO (Mod.) Corrugated Beam Guide Railing to Single Slope Concrete Half Section Barrier	Each
606.8904	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Beam Box Beam Median Barrier	Each
606.8905	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Weak Post Corrugated Beam Median Barrier	Each
606.8906	Transition: HPBO (Mod.) Corrugated Beam Median Barrier to Single Slope Concrete Median Barrier	Each

In 710-18, **change** the title to **"HPBO (Mod.) CORRUGATED BEAM GUIDE RAILING END TERMINAL (ENERGY ABSORBING)"**

In 710-18, **SCOPE**, and **BASIS OF ACCEPTANCE**, **change**:

"HPBO Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)" to
 "HPBO (Mod.) Corrugated Beam Guide Railing End Terminal (Energy-Absorbing)"

In 710-19, **change** the title to **"HPBO (Mod.) CORRUGATED BEAM MEDIAN BARRIER END TERMINAL (ENERGY ABSORBING)"**

In 710-19, **SCOPE**, and **BASIS OF ACCEPTANCE** **change**:

"HPBO Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)" to

Modified Heavy Post Blocked-Out (HPBO (Mod.)) Corrugated Beam Guide Railing and Median Barrier

"HPBO (Mod.) Corrugated Beam Median Barrier End Terminal (Energy-Absorbing)"

In 710-20, **delete** the section "Splices" in its entirety and **replace** with:

"Splices and Post Bolts. Splices and post bolts shall be made with flat, roundheaded, grippable, galvanized bolts, nuts, and washers conforming to the following, unless specified otherwise in the contract documents: Bolts ASTM F1554 Grade 36, Nuts ASTM A563 Grade A or better, and Washers ASTM F844. They shall be galvanized in accordance with the requirements of §719-01 Galvanized Coatings and Repair Methods, Type II (ASTM A153) unless another coating is specified.

Post bolts and the splice bolts shall be as detailed on the Standard Sheets."

Delete "710-28 THRU 710-29 (VACANT)" in its entirety and **replace** with:

"710-28 ANCHOR BOLTS FOR GUIDE RAILING AND MEDIAN BARRIER

SCOPE. This specification covers the material requirements for anchor bolts.

MATERIALS REQUIREMENTS. Anchor bolts shall meet the requirements of ASTM A449. A hex nut and flat washer shall be supplied with each anchor bolt and their dimensions shall be as shown on the plans or Standard Sheets. The hex nut and flat washer shall be manufactured in accordance with ASTM A325. The nuts, washers, and the top 305 mm of the anchor bolts shall be galvanized in accordance with the requirements for Type II or Type V galvanizing as stated in section §719-01, Galvanized Coatings and Repair Methods. The anchor bolt, nut and washer dimensions shall be as shown on the plans or Standard Sheets.

SHIPPING. Anchor bolts, hex nuts, and washers shall be shipped to the construction site at a time convenient to the masonry construction.

BASIS OF ACCEPTANCE. Anchor bolts will be accepted upon the manufacturer's certification that they meet the requirements of this section.

710-29 (VACANT)"