MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Addendum to the

Guidelines for Traffic Barrier Placement and End Treatment Design

April 2018

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This Guidance is Supplemental to the March 2006 Guidelines for Traffic Barrier Placement and End Treatment Design.

Design Guidance for Traffic Barrier Replacement

Any new barrier installation or barrier that is impacted by construction and to be replaced as part of a project should comply with the AASHTO Manual for Assessing Safety Hardware (MASH) 2016 testing standards.

Replacement of other existing traffic barrier as part of a project is heavily dependent on the funding type that the project falls under, project scope, the condition of the existing barrier, and whether it meets NCHRP 350.

Any traffic barrier that is impacted by a project will need to be replaced, regardless of the funding type, but the extent of impact and replacement will vary among different funding sources and the scope of the project/fund. Safety-focused projects should by their nature look more carefully at all existing barrier in the project limits, and replace as necessary and/or as directed, depending on the scope and funding of the project. A roadway reconstruction project may instead replace only that barrier which is impacted by construction, leaving existing barrier that is in good shape and compliant with NCHRP 350.

When traffic barrier is in poor condition, it should be upgraded to the current standards (MASH 2016), depending on the project type and scope. The length of barrier that gets replaced will also be dependent on the project scope.

If existing barrier is in good condition, and is compliant with NCHRP 350, then per the AASHTO/FHWA MASH 2016 Implementation memo, it does not need to be replaced. Please see Table 1 on the next page for general guidance on how to approach traffic barrier replacement based on project funding and scope.

Below is some general guidance for replacement of w-beam traffic barrier:

- All replacement barrier should meet the current standard (MASH 2016 compliant) unless noted.
- Any end treatments affected by the replacement of barrier shall be replaced with an end treatment that is currently listed on the MDOT SHA qualified products list (QPL)
- Turndown style (Type G) end treatments can remain as the downstream end treatment when opposite direction traffic cannot impact it.
- To transition from new barrier (31” height, splice at mid-span) to existing barrier (shorter height, splice at post), see MDOT SHA standard 605.32. A maximum transition of 2” in height per 12’6” panel should be used.

For Maintenance contracts, please see Table 2 below for guidance on replacement of damaged sections of existing traffic barrier.

TABLE 1. BARRIER REPLACEMENT MATRIX BY PROJECT TYPE

PROJECT TYPE:	SHOULD REPLACE:	CONSIDER REPLACEMENT:
RECONSTRUCTION PROJECTS	• MEET CURRENT STANDARDS WITH NEW RUNS OF BARRIER OR BARRIER THAT IS IMPACTED BY CONSTRUCTION • RAISE OR REPLACE BARRIER THAT IS DAMAGED OR LESS THAN 28". • STEEL BLOCK-OUTS SHOULD BE REPLACED • END TREATMENTS WITHIN THE LIMIT OF WORK THAT ARE DAMAGED OR NOT ON THE CURRENT QPL SHOULD BE REPLACED	• ALL EXISTING BARRIER WITHIN LOD (DEPENDING ON PURPOSE/SCOPE OF IMPROVEMENTS)
INTERSECTION IMPROVEMENTS/ SPOT SAFETY	• MEET CURRENT STANDARDS WITH NEW RUNS OF BARRIER OR BARRIER THAT IS IMPACTED BY CONSTRUCTION • RAISE OR REPLACE BARRIER THAT IS DAMAGED OR LESS THAN 28". • STEEL BLOCK-OUTS SHOULD BE REPLACED • END TREATMENTS WITHIN THE LIMIT OF WORK THAT ARE DAMAGED OR NOT ON THE CURRENT QPL SHOULD BE REPLACED	• ALL EXISTING BARRIER WITHIN LOD (DEPENDING ON PURPOSE/SCOPE OF IMPROVEMENTS)
RESURFACING	• BARRIER THAT IS DAMAGED OR LESS THAN 27" SHOULD BE RAISED OR REPLACED. • STEEL BLOCK-OUTS SHOULD BE REPLACED • END TREATMENTS WITHIN THE LIMIT OF WORK THAT ARE DAMAGED OR THE TYPE G (TURNDOWN) SHOULD BE REPLACED	• RAISE OR REPLACE BARRIER THAT IS LESS THAN 29". • ON INTERSTATES AND OTHER HIGH-SPEED FACILITIES, CONSIDER REPLACING END TREATMENTS THAT ARE NOT ON THE CURRENT QPL
TRAFFIC BARRIERS	• MEET CURRENT STANDARDS WITH NEW RUNS OF BARRIER • RAISE OR REPLACE BARRIER THAT IS DAMAGED OR LESS THAN 27". • STEEL BLOCK-OUTS SHOULD BE REPLACED • END TREATMENTS WITHIN THE LIMIT OF WORK THAT ARE DAMAGED OR THE TYPE G (TURNDOWN) SHOULD BE REPLACED	• BARRIER THAT IS LESS THAN 29" SHOULD BE RAISED OR REPLACED. • ON INTERSTATES AND OTHER HIGH-SPEED FACILITIES, CONSIDER REPLACING END TREATMENTS THAT ARE NOT ON THE CURRENT QPL
BRIDGE REHABILITATION AND REPLACEMENT	• ANY BARRIER IMPACTED BY CONSTRUCTION • ENSURE THAT TRANSITION FROM W-BEAM TO CONCRETE BRIDGE PARAPET MEETS CURRENT STANDARDS • END TREATMENTS WITHIN THE LIMIT OF WORK THAT ARE DAMAGED OR THE TYPE G (TURNDOWN) SHOULD BE REPLACED	• ON INTERSTATES AND OTHER HIGH-SPEED FACILITIES, CONSIDER REPLACING END TREATMENTS THAT ARE NOT ON THE CURRENT QPL
PEDS/BIKES	• ANY BARRIER IMPACTED BY CONSTRUCTION	
HYDRAULICS/ ENVIRONMENTAL	• ANY BARRIER IMPACTED BY CONSTRUCTION	

TABLE 2. W-BEAM BARRIER REPLACEMENT MATRIX FOR MAINTENANCE CONTRACTS

LENGTH OF IMPACTED SECTION	REPLACEMENT HEIGHT	REPLACEMENT SPLICE LOCATION	REPLACEMENT BLOCK OUT	REPLACEMENT END TREATMENT (IF NEEDED)
100 FEET OR LESS	SAME HEIGHT AS EXISTING RAIL. [1]	SAME AS EXISTING RAIL (LIKELY AT THE POST)	COMPOSITE OR WOOD	SAME TYPE AS EXISTING, ENSURING THAT THE PRODUCT IS ON THE CURRENT QPL. [3]
MORE THAN 100 FEET	NEW STANDARD HEIGHT (31"). [2]	NEW STARDARD LOCATION (MID-SPAN BETWEEN POSTS). [2]	COMPOSITE OR WOOD	SAME TYPE AS EXISTING, ENSURING THAT THE PRODUCT IS ON THE CURRENT QPL. [3]

1. If the height of the existing rail is less than 27" (to the top of the barrier); the traffic barrier should be programmed for full replacement as prioritized by the District.
2. To transition from new barrier (31" height, splice at mid-span) to existing barrier (shorter height, splice at post), see MDOT SHA standard 605.32. A maximum transition of 2" in height per 12'6" panel should be used.
3. Type G (turndown) end treatments are prohibited on high-speed roadways.

Concrete barriers are rigid barriers that require almost no maintenance because they are rarely damaged due to an impact. When concrete barriers are repaired, it is often to just replace the damaged barrier in kind. While this is often the best course of action, regardless of the shape of the barrier or the height of the barrier, there are times when replacing a section of the barrier may be advantageous. Please see Table 3 for concrete barrier repair and replacement. 34-inch F-shape barrier should be upgraded to a 42-inch F-shape barrier only when the location warrants a TL-4 barrier. 42-inch F-shape barrier should always be replaced with 42-inch F-shape barrier.

TABLE 3. CONCRETE BARRIER REPAIR/REPLACEMENT MATRIX

REPLACE WITH EXISTING SHAPE/HEIGHT	UPGRADE BARRIER TO F-SHAPE/TALLER BARRIER
• IF AFFECTED BARRIER AREA IS IN THE MIDDLE OF A RUN OF BARRIER • IF CONDITIONS STILL WARRANT A TL-3 BARRIER • IF A MAJOR RECONSTRUCTION PROJECT IS PLANNED IN THE AREA THAT WILL IMPACT OR REPLACE CONCRETE BARRIER	• IF THERE IS A TERMINUS OF THE BARRIER WITHIN 100' OF THE AFFECTED AREA, REPLACE FROM AFFECTED AREA TO TERMINUS • IF CHANGING TRAFFIC CONDITIONS WARRANT A NEW TL-4 BARRIER (RECONSTRUCTION)