

CATEGORY 600 SHOULDERS

SECTION 601 – AGGREGATE BASE FOR SHOULDERS – RESERVED

SECTION 602 – SOIL-CEMENT BASE FOR SHOULDERS – RESERVED

SECTION 603 – CHIP SEAL SURFACE TREATMENT FOR SHOULDERS – RESERVED

SECTION 604 – HOT MIX ASPHALT FOR SHOULDERS – RESERVED

SECTION 605 – EARTH SHOULDERS

605.01 DESCRIPTION. This work shall consist of constructing shoulders using earth as specified in the Contract Documents.

605.02 MATERIALS. Refer to Section 204.

605.03 CONSTRUCTION. Earth shoulders shall be constructed in conformance with Section 204.03.

The Contractor shall provide and employ a shoulder template to ensure uniformity of the shoulder surfaces. The finishing operations shall conform to Section 208.03.02.

605.04 MEASUREMENT AND PAYMENT. Earth shoulders will not be measured but the cost will be incidental to the Contract unit price per cubic yard for the appropriate class of Excavation or Borrow Material.

**SECTION 606 – OPEN GRADED FRICTION COURSE
FOR SHOULDERS – RESERVED**

**SECTION 607 – PORTLAND CEMENT CONCRETE
PAVEMENT FOR SHOULDERS – RESERVED**

SECTION 608 – SLURRY SEAL FOR SHOULDERS – RESERVED

**SECTION 609 – CURB, COMBINATION CURB AND
GUTTER, AND MONOLITHIC MEDIAN**

609.01 DESCRIPTION. This work shall consist of constructing concrete curb, concrete combination curb and gutter, concrete curb openings, concrete monolithic median, concrete valley gutter and Hot Mix Asphalt (HMA) curb as specified in the Contract Documents or as directed by the Engineer. See also Standard Detail Plates G-27 through G-29 for requirements to evaluate curb ramps affected by trench restoration.

609.02 MATERIALS.

Crusher Run Aggregate CR-6	901.01
Aggregate size No. 57	901.01
Selected Backfill	302
Curing Materials	902.07
Form Release Compound	902.08
Concrete Mix No. 2	902.10.03
Concrete Mix No. 6	902.10.03
Hot Mix Asphalt	904
Emulsified Asphalt (Tack Coat)	904.03
Reinforcement Steel	908.01
Joint Sealer	911.01
Preformed Joint Filler	911.02
Borrow Excavation	916.01
3 In. Diameter Plastic Pipe	905

609.03 CONSTRUCTION.

609.03.01 Concrete Curb, Combination Curb and Gutter, Valley Gutter and Monolithic Median.

- (a) **Excavation.** Excavation shall be to the specified depth and to a width that permits installation and bracing of the forms. The subgrade shall be compacted to 92 percent in conformance with T 180, Method C, and trimmed to the proper shape and required grade. All soft and unsuitable material shall be removed and replaced with suitable material approved by the Engineer.
- (b) **Forms.**
- (1) **Fixed Form Method.** Fixed forms shall be steel of an approved design, securely fastened and braced to prevent any movement during the placing of concrete. Forms shall extend to the full depth of the concrete. They shall not be less than 10 ft long. When installation is made along curves where the radius of the curb face is less than 200 ft, flexible or curved steel or wooden forms shall be used that are not more than 6 ft long. Both wooden and steel forms shall be properly designed and acceptable to the Engineer. They shall be installed to prevent buckling or warping. The tolerance shall not exceed 1/4 in. in 10 ft in either the grade or alignment. Forms shall be thoroughly cleaned and coated with form release compound each time they are used.
- (2) **Slip-Form Method.** Slip-form construction shall conform to Section 610.03.01(b)(2).
- (c) **Concreting.** Concrete shall be mixed in conformance with Section 915.03.04. Volumetric batching and continuous mixing will be permitted. When the subgrade is dry, it shall be moistened with as much water as it can absorb. Consolidation of concrete placed in the forms shall be by spading or other methods approved by the Engineer. Except for curb face forms, the forms shall remain in place for a minimum of 12 hours and precautions taken to avoid damaging the concrete. Curb face forms shall be stripped as soon as the concrete will retain its shape.
- (d) **Depressed Curbs.** Curbs shall be depressed at entrances and sidewalk ramps as specified in the Contract Documents or as directed by the Engineer.
- (e) **Openings.** Drainage openings for the purpose of allowing rain spout water or other drainage to outlet shall be provided by constructing insert openings within the curb as directed by the Engineer.

Curb openings shall be provided as specified in the Contract Documents.

(f) Finishing. Concrete shall be struck off to the cross section specified after which it shall be finished, floated smooth and followed with a broom type textured finish. The Engineer may permit other methods of finishing for the purpose of matching adjacent concrete finishes. Plastering will not be permitted. All exposed edges shall be edged with a 1/4 in. edging tool except the face edge of curb shall have a 1 in. radius. When finished, the top surface of curbs and medians as well as the faces shall show no deviation from grade and alignment in excess of 1/4 in. per 10 ft. All honeycombed and damaged areas shall be repaired immediately after the removal of the forms in a manner acceptable to the Engineer.

(g) Joints.

(1) Fixed Form Method. Spacing between joints shall be 10 ft except where shorter spacing is necessary for closures and conformity to expansion and contraction joints in contiguous concrete pavements. No joint spacing shall be shorter than 4 ft. The joints shall be formed by using plate steel templates which are 1/8 to 3/16 in. thick and shall have a width and depth equal to the unit cross section. The templates shall be set perpendicular to the grade and line of the unit. Intermediate templates or sections of templates shall not be used. Where stationary structures such as bridges and inlets are encountered, an expansion joint shall be constructed for the full depth using 1/2 in. preformed expansion joint filler. Expansion joints shall be constructed at a maximum of 100 ft, and at points of curves, tangents and at locations coinciding with adjoining pavement joints. Expansion joints are not required when adjacent to a flexible pavement or away from any pavement.

Extend the expansion joint material to the full depth of the unit cross section. Apply sealer to the entire gutter portion and 1 inch up the face of all joints. In addition, seal the entire expansion joint of monolithic medians.

(2) Slip-Form Method. Slip-form construction shall be as specified in Section 611.03.01(b). Joint spacing shall be as specified in Section 609.03.01(g)(1).

(h) Cold Weather Construction and Curing. Refer to Section 520.03.02 for cold weather construction and to Section 520.03.12 for concrete curing.

(i) Backfill. After curing for at least 72 hours, use approved material to backfill the front and back of the curb, combination curb and gutter, and median to the required elevations. Complete the backfilling before rolling the adjacent roadway.

(j) The Engineer shall approve the scheduling for the forming and placement of **valley gutters** across intersections in order that traffic may be controlled during placement and curing. Normal procedure is construction of the valley gutter across half of the road width at a time, unless full access for traffic on the street to be closed can be maintained via an adjacent intersection. Prior notification of adjacent businesses and homes shall be provided in advance of closures or partial closures of a road for this purpose.

The Engineer shall review and approve the grading of the valley gutter prior to concrete placement. A minimum grade of 0.5% along the line of the valley gutter shall be maintained in all cases and the approved grade shall flow into and from the valley gutter at a slope equal to or greater than the minimum 0.5% slope in order to maintain drainage of the road surface and avoid puddles and icing at intersections.

609.03.02 Hot Mix Asphalt (HMA) Curb. HMA curb shall be placed by a self-propelled machine. The machine shall form curbing that is uniform in texture, shape, density and to a template as specified in the Contract Documents unless otherwise approved by the Engineer.

The base upon which the curb is to be placed shall be clean, dry and stable. It shall be tack coated with emulsified asphalt of the type and amount as directed by the Engineer.

When required, the curb shall be backfilled after it has sufficiently hardened to prevent damage. Consolidate the backfill by tamping or rolling.

609.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all concrete, Hot Mix Asphalt, forms, excavation, back-fill, disposal of excess material, drainage openings, joint sealer, emulsified asphalt tack coat, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

609.04.01 Curb, Combination Curb and Gutter and Monolithic Median will be measured and paid for at the Contract unit price per linear foot. **Concrete Curbs** and **Hot Mix Asphalt Curbs** and **Concrete Combination Curb and Gutter** will be measured along the front face of the curb. **Concrete Monolithic Median** will be measured along the center line of the finished top of median.

When existing curb or combination curb and gutter is removed and replaced with new curb or combination curb and gutter, the cost of the removal will be incidental to the Contract unit price for the new item.

609.04.02 Concrete Curb Openings or Concrete Combination Curb and Gutter Openings will be measured and paid for at the Contract unit price per each.

609.04.03 The removal and disposal of unsuitable material in cut sections will be measured and paid for at the Contract unit price per cubic yard for **Class 2 Excavation**. The replacement with suitable material shall be excavation from other areas, borrow, or select backfill as directed by the Engineer.

609.04.04 When the Engineer authorizes **Borrow Excavation** or **Selected Backfill using No. 57 Aggregate** or **Selected Backfill using Crusher Run Aggregate CR-6** as replacement material for the Class 2 Excavation, it will be measured and paid for at the Contract unit price per cubic yard for the respective items as specified in the Contract Documents.

609.04.05 The cost of building gutters through inlets, where necessary, will be paid at the price bid for *Combination Curb and Gutter*. The cost of reinforcing steel for inlet gutters will not be paid for directly, but must be included in prices for items bid.

609.04.06 Three-inch diameter plastic pipe for drainage through curbing and under sidewalks will be included in the cost of curb and gutter.

609.04.07 *Seven (7) Inch Concrete Valley Gutter* will be measured and paid for at the Contract unit price per square foot, measured complete and in place at the proper grade. The price paid shall include the cost of patching adjacent pavement to match the upper edges of the valley gutter.

SECTION 610 – SIDEWALKS

610.01 DESCRIPTION. Construct hot mix asphalt (HMA) or concrete sidewalks, concrete stairs, railings and sidewalk ramps. Ensure that the sidewalks and sidewalk ramps are constructed in accordance with the most recent accessibility guidelines of the Americans with Disabilities Act (ADA).

610.02 MATERIALS.

Curing Materials	902.07
Form Release Compound	902.08
Concrete Mix No. 2	902.10.03
Hot Mix Asphalt (HMA)	904
Welded Wire Fabric	908
Joint Sealer	911.01
Preformed Joint Fillers	911.02
Roofing Paper	911.07
Railings	Std. Detail Plates G-10, G-11, G-12

610.03 CONSTRUCTION.

610.03.01 Concrete Sidewalks.

(a) **Excavation.** Refer to Section 609.03.01(a).

(b) **Forms.**

(1) **Fixed Form Method.** Fixed forms shall be of steel or wood and shall extend to the full depth of the concrete. All forms shall be straight, free from warp and of sufficient strength to resist the pressure of the concrete without displacement.

Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal. The forms shall be thoroughly cleaned and coated with a form release compound each time they are used. Forms shall not be stripped until the concrete has set for at least 12 hours, and every precaution shall be taken to avoid damaging the concrete.

- (2) **Slip-Form Method.** Slip-form construction shall conform to the slip-form method specified in Section 611.03.01(b), except that joint construction shall conform to paragraph (e) of this Subsection.
- (c) **Concreting.** Before placing concrete, the subgrade (when dry) shall be moistened with as much water as it can absorb. The concrete shall be mixed in conformance with Section 915.03.04. Volumetric batching and continuous mixing will be permitted. Concrete shall be deposited on the prepared subgrade in successive batches to the full width of the sidewalk. It shall be thoroughly spaded along the edges and shall be tamped to eliminate voids. It shall be struck off, screeded to the elevation of the top of the forms and finished.
- (d) **Finishing.** The surface shall be floated and broom finished. No plastering of the surface will be permitted. All outside edges and all joints shall be edged with a 1/4 in. edging tool.
- (e) **Joints.** Joints shall be placed as specified in the Contract Documents. Dummy joints shall be tooled or sawed a minimum of 3/4 in. deep.
- Expansion joint material shall extend the full depth of the concrete. Match adjacent joints in curb and pavement.
- (f) **Cold Weather Protection and Curing.** Refer to Section 520.03.02 for cold weather protection and to Section 520.03.12 for concrete curing. During the curing period, all pedestrian and vehicular traffic shall be prohibited.

610.03.02 Hot Mix Asphalt (HMA) Sidewalks.

- (a) **Excavation.** Excavation, subgrade and forms when required shall conform to Sections 610.03.01(a) and (b).
- (b) **Placement.** HMA Sidewalk shall conform to Section 504.03.05. When the sidewalk is not formed, backfill material acceptable to the Engineer shall be used to form an 18 in. wide earth shoulder for the HMA or as specified in the Contract Documents.
- (c) **Compaction.** Compaction shall be accomplished by means of a roller approved by the Engineer. In areas inaccessible to the roller, a vibrating plate compactor or hand tamping may be used. In any case, the HMA shall be uniformly compacted. Compactive effort shall start as soon as the HMA can be compacted without displacement and shall continue until the material is thoroughly compacted and all marks have been removed.

610.03.03 Backfill. The sidewalk backfill shall conform to Section 210. Suitable backfill materials shall be obtained from excavation for the sidewalk or from other areas, borrow, or selected backfill as directed by the Engineer.

After the forms have been stripped and repairs are satisfactorily completed, backfill the spaces in front and back of the sidewalk to the required elevations using approved material.

610.03.04 Pedestrian Ramps. Wherever sidewalks are built concurrently with bituminous or concrete curbs, the Contractor shall make provisions for pedestrian ramps at all curb returns on intersecting streets in accordance with the most recent ADA guidelines, and as directed by the Engineer.

610.03.05 Concrete Stairs and Stair Railings shall be constructed in accordance with the most recent ADA guidelines and with Standard Detail Plates G-9 through G-12 in locations as specified on Plans, Special Provisions or as directed by the Engineer

610.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all excavation, backfill, disposal of excess or unsuitable material, forms, joints, sealer, compaction, curing, finishing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

610.04.01 Concrete Sidewalks, including sidewalk ramps, will be measured and paid for at the Contract unit price per square foot of finished surface. When the existing sidewalk is removed and replaced with a new sidewalk, the cost to remove the existing sidewalk will be incidental to the Contract unit price for *Concrete Sidewalk*.

610.04.02 Hot Mix Asphalt Sidewalks will be measured and paid for at the Contract unit price per ton for the mixture placed.

610.04.03 The removal and disposal of unsuitable material below the subgrade will be measured and paid for at the Contract unit price per cubic yard for *Class 2 Excavation*. The replacement with suitable material shall be excavation from other areas, borrow, or select backfill as directed by the Engineer.

610.04.04 When the Engineer authorizes *Borrow Excavation* or *Selected Backfill using No. 57 Aggregate* or *Selected Backfill using Crusher Run Aggregate CR-6* as replacement material for the Class 2 Excavation, it will be measured and paid for at the Contract unit price per cubic yard for the respective items as specified in the Contract Documents.

610.04.05 Concrete - Steps & Miscellaneous Structures will be measured and paid for at the Contract unit price per cubic yard of concrete for the concrete mix used per Plans, Special Provisions or the direction of the Engineer.

610.04.06 Ornamental Stair Railings or Pipe Stair Railings for use with concrete steps will be measured and paid for at the Contract unit price per linear foot for the type of railing to be installed per Plans, Special Provisions or the direction of the Engineer.

SECTION 611 – CONCRETE TRAFFIC BARRIERS

611.01 DESCRIPTION. Construct concrete traffic barriers.

611.02 MATERIALS.

Crusher Run Aggregate CR-6	901.01
Aggregate	901.01, Size No. 57
Curing Materials	902.07
Form Release Compound	902.08
Concrete Mix No. 2	902.10
Concrete Mix No. 6	902.10
PVC Pipe	905
Reinforcement Steel	908
Prefomed Joint Fillers	911.02
Borrow Excavation	916.01
Geotextile	921.09
Reflective Delineators	As approved by the MdSHA QPL

Use concrete mix No. 6 to construct all concrete traffic barriers, end transitions, and footers unless otherwise specified. Before beginning work, construct a sample panel approximately 2 ft x 2 ft x 3 in. using the proposed concrete mix design. After 28 days, the concrete shall match Federal Standard No. 595, Color 37722 or lighter. Keep the approved sample panel at the construction site to be used by the Engineer to compare the color of the concrete barrier to the sample panel for adjustments and approval.

Prepare a sample panel for each source of supply.

611.03 CONSTRUCTION. Use cast-in-place construction. Excavate to the required depth and to a width that will permit the installation and bracing of forms where necessary. Remove all soft and unsuitable material, and replace it with suitable material. Properly shape the subgrade and compact it as specified in Section 208.

611.03.01 Concrete Barriers. Forming of the footer or concrete barrier may be by either the fixed form or the slip-form method. Do not construct the footer and the barrier section monolithically.

- (a) **Fixed Form Method.** Use steel forms with a tolerance in grade and alignment of 1/4 in. in 10 ft. For bifurcated and transition sections, other forming materials may be used as directed.

Thoroughly clean and coat the forms with form release compound each time they are used.

Mix and place concrete as specified in Section 915.03.04 and Section 414, respectively. Volumetric batching and continuous mixing will be permitted. Vibrate concrete using an approved immersion type mechanical vibrator.

Saw or form construction and contraction joints at 20 ft intervals with a minimum of 10 ft. For saw time requirements, refer to Section 520.03.14(c)(1). Place expansion joints where specified or as directed. Ensure that all joints in footers and walls align.

Finish concrete as specified in Section 611.03.03 except apply a broom finish to the surface when forms are stripped in less than 24 hours. Remove the face forms for finishing as soon as the concrete can retain its shape.

After removing the forms, immediately repair all honeycombed and damaged areas.

- (b) **Slip-form Method.** Use approved slip-form equipment. The equipment shall have internal vibrating capability and automatic guidance controls to follow line and grade references. On vertical and horizontal curves, set an additional intermediate support in the field to establish an acceptable reference line. Do not use ski or shoe sensors. This method shall not be used within 5 ft. of either side of a utility junction box. Use the fixed form method.

Mix concrete as specified in Section 915.03.04. Ensure that the consistency of the concrete after extrusion will maintain the shape of the barrier without support. Provide surfaces that are free of pits larger than 3/16 in. diameter and that require no further finishing other than a broomed finish.

Whenever a tear occurs during the operation of the slip-form equipment, repair it immediately or remove and replace as directed.

Saw or form construction and contraction joints at 20 ft intervals in the barrier and footer with a minimum of 10 ft, except in the area of miscellaneous structures 6 ft will be permitted. Saw the joints 1/8 in. wide and at least 2 in. deep. Place expansion joints as specified or as directed.

611.03.02 Curing. Cure and protect concrete as specified in Section 414.

611.03.03 Finished Surface. Finish concrete as specified in Section 414. The completed barriers shall be within 1/4 in. in 10 ft from the specified horizontal and vertical lines. The barrier shall present a smooth, uniform appearance.

611.03.04 Reflective Delineators. Install reflective delineators on the concrete traffic barrier as specified.

611.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all test panels, excavation, removal of existing hot mix asphalt, disposal of excess or unsuitable material, reinforcement, drilled holes, drainage appurtenances, geotextile, No. 57 aggregate, conduit, boxes and fittings, backfilling, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The removal and disposal of unsuitable material will be measured and paid for at the Contract unit price for *Class 2 Excavation*, which price includes the cost of using suitable excavation as replacement material. When *Borrow* or *Selected Backfill* is authorized as replacement material, payment will be made at the Contract unit price for the respective items.

The removal of existing concrete traffic barriers will not be measured unless specified elsewhere in the Contract Documents.

611.04.01 Concrete Traffic Barriers will be measured and paid for at the Contract unit price per linear foot. Measurement will be along the center line of the top of the barrier.

611.04.02 Concrete Traffic Barrier End Transitions will be measured and paid for at the Contract unit price per each.

611.04.03 Reflective Delineators will be measured and paid for at the Contract unit price per each.

SECTION 612 – METAL TRAFFIC BARRIERS

612.01 DESCRIPTION. Construct metal traffic barriers.

612.02 MATERIALS.

Brown Polyester Coating	917.03
W Beam	918.01
Metal Posts	918.02
Traffic Barrier Hardware	918.03
Timber Posts	918.04
Wood Offset Blocks	918.04

Wire Rope	918.05
Rub Rail	A 36, Galvanized, A 123
Thrie Beam	M 180, Class A, Type 2
Reflective Delineators	As approved by the Bureau of Traffic Engineering and Transportation Planning
Recycled Composite Material Offset Blocks	As specified by the manufacturer

612.03 CONSTRUCTION.

612.03.01 Post Installation. Drive all posts, unless otherwise approved. Use a method of driving that will not batter or distort the posts. If posts are not driven, set them in holes of sufficient diameter to allow tamping of the backfill. Backfill with approved material. Place backfill in horizontal layers not exceeding 6 in. loose depth and thoroughly compact. When it is necessary to place posts in existing paving, remove all loose material and replace the paving. Prior to installing rail or cable elements, properly align the posts to within 1/4 in. of line and grade. Install all posts plumb.

When rock is encountered at a depth less than the specified footing depth, drill a 12 in. diameter hole 20 in. into the rock or to the planned footing depth, whichever is less. If the 20 in. depth is reached prior to the planned depth, cut the post to the appropriate length. Paint the cut edge with approved galvanizing repair paint. Set the post and backfill with an approved material. Do not use concrete or grout material. Place the backfill in horizontal layers not exceeding 6 in. loose depth and thoroughly compact.

612.03.02 Rail Assembly. Furnish rail elements as specified. Ensure a smooth continuous installation, with laps in the direction of traffic flow. Ensure that all bolts are drawn tight.

612.03.03 Offset Blocks. When installing new traffic barrier W beam, use either wood or recycled composite offset blocks. Do not mix different types of manufactured composite blocks or mix composite and wood blocks. All offset blocks shall be routed or grooved to prevent them from rotating.

When an existing steel offset bracket is damaged, replace it with a new steel bracket.

612.03.04 Brown Polyester Coated Traffic Barrier W Beam Using 6 Foot Post or 8 Foot Post. Ensure that all components are padded and handled with nylon slings during loading, unloading, and installation.

Preserve the integrity of the polyester coating. If the polyester coating is chipped, scratched, blistered, or otherwise separated from the base metal, repair the damaged areas using the manufacturer's repair kit. Complete all repairs to the satisfaction of the Engineer or replace the damaged material at no additional cost to the County.

612.03.05 W Beam Barrier Reflective Delineators. Install reflective delineators as specified.

612.03.06 Remove and Reset Existing Traffic Barrier. When removing and resetting an entire run or a portion of a run of traffic barrier, replace the metal offset brackets with either wood or recycled composite offset blocks. When removing and resetting an entire run, use 8 in. offset blocks. When removing and resetting only a portion of a run, use 6 in. offset blocks. Ensure that the holes in the blocks match the holes in the existing posts. Move the posts at least 1 ft in either direction from the existing location. When resetting the rail, measure the height of the rail to ensure that it conforms to the current height shown in the MdSHA's Book of Standards for Highway and Incidental Structures. Unless otherwise directed, maintain the existing offset distance from the edge of the roadway.

612.03.07 Remove and Reset Existing Median Traffic Barrier W Beam. Refer to Section 612.03.06.

612.03.08 End Treatments. Refer to Section 614.

612.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all rock excavation, restoration of grassed or paved areas, drilled post holes and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

612.04.01 Traffic Barrier W Beam Using 6 Foot Post or 8 Foot Post will be measured and paid for at the Contract unit price per linear foot. When a bottom W beam panel is specified for the Traffic Barrier W Beam item it will be measured and paid for at the Contract unit price per linear foot for Traffic Barrier W Beam Panel.

612.04.02 Traffic Barrier W Beam Median Barrier will be measured and paid for at the Contract unit price per linear foot.

612.04.03 Traffic Barrier Thrie Beam will be measured and paid for at the Contract unit price per linear foot.

612.04.04 Replace 6 or 8 Foot Posts, Install 6 or 8 Foot Posts, Splice Joints, and W-Beam Panel Replacement will be measured and paid for at the Contract unit price as specified in the Contract Documents for units with the selected coating.

612.04.05 Remove and Dispose of Existing Traffic Barrier W Beam and Remove and Salvage Existing Traffic Barrier W Beam will be measured and paid for at the Contract unit price per linear foot.

612.04.06 Remove and Reset Existing Traffic Barrier will be measured and paid for at the Contract unit price per linear foot. Offset blocks will not be measured but the cost will be incidental to the item.

612.04.07 *Remove and Reset Existing Median Traffic Barrier W Beam* will be measured and paid for at the Contract unit price per linear foot. Offset blocks will not be measured but the cost will be incidental to the item.

612.04.08 *Traffic Barrier W Beam Median Barrier with Bottom Panel* will be measured and paid for at the Contract unit price per linear foot.

612.04.09 *Remove and Reset Existing Median Traffic Barrier W Beam with Bottom Panel* will be measured and paid for at the Contract unit price per linear foot.

612.04.10 *W Beam Barrier Reflective Delineators* will be measured and paid for at the Contract unit price per each.

612.04.11 The application of fusion bonded brown polyester coating to Traffic Barrier W Beam, as well as all special handling and touch up will not be measured but the cost will be incidental to the item to which the coating is applied.

SECTION 613 – RESERVED

SECTION 614 – PERMANENT TRAFFIC BARRIER END TREATMENTS

614.01 DESCRIPTION. Furnish, and install permanent traffic barrier end treatments.

614.02 MATERIALS. Refer to Section 612.02 and the following:

End Treatments and Spare Parts Packages	As specified by the manufacturer
Hazard Marker	As approved by MdSHA QPL
Plastic Barrels	As approved by MdSHA QPL
Sand	901.01
Graded Aggregate Base	901.01
Bank Run Gravel Base	901.01
Common Borrow	916.01.04
Topsoil	920.01
Concrete Mix 2 and 6	902.10

614.03 CONSTRUCTION.

614.03.01 End Treatments.

- (a) **Type A System.** Bury the ends of the traffic barrier, the end anchorage terminal, and the rub rail when required, in a cut slope. Excavate the slope to install these components. Upon installation, backfill the area to match the adjacent slope, compact, seed, mulch, and install soil stabilization matting as directed. For single rail systems, use 6 ft posts throughout the entire end treatment. For double rail systems, use 8 ft posts, except for the last three posts buried in the cut slope.

Construct the end anchorage terminal using either option 1 or 2 from the MdSHA's Book of Standards for Highway and Incidental Structures.

Install traffic barrier W beam as specified in Section 612.03.

- (b) **Type B System.** Install according to the manufacturer's recommendations.
- (c) **Type C, D, E, and F.** Install these systems in a straight line, unless otherwise specified by the manufacturer and approved by the Engineer. Refer to the manufacturer's recommendations for installation methods and procedures.
- (d) **Nose Section.** Reflectorize as approved by the Bureau of Traffic Engineering.
- (e) **Finish Coat.** Traffic barrier end treatments shall have the same finish coat as the W beam traffic barrier to which they are attached.
- (f) **Sand Filled Plastic Barrels (SFPB).** Provide the components and assemble, place in the required configuration, and fill each barrel according to the manufacturer's recommendations or as specified in the Contract Documents. Ensure that each SFPB is watertight and separated from other SFPB by a distance of 3 in. Place the last row of SFPB 12 in. from the shielded object.

Reflectorize the first barrel of the SFPB configuration as specified.

Ensure that all sand is dry and loose. Do not use bags of sand. Add an antifreeze agent to the sand according to the manufacturer's recommendations.

614.03.02 Surface Adjustment. When surface adjustment is required for installation of Type B, C, D, E, and F end treatments, use any class of excavation available on the project. When excavation is not available on the project, use crusher run aggregate CR-6, bank run gravel subbase, borrow, topsoil, or asphalt milling and grindings. Complete the surface adjustment within 48 hours.

614.03.03 Transitions to Existing Structures. When transitions to existing structures or traffic barriers are required, perform the work as recommended by the manufacturer.

614.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all excavation, removal of the existing end treatment to be replaced, fabrication of all component parts, transitions to barriers, reflectorization, backfill, compaction, restoration of grassed or paved areas, seed and mulch, soil stabilization matting, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

614.04.01 Type A *End Anchorage Terminal Either Option* will be measured and paid for at the Contract unit price per each.

614.04.02 Type B through H, J, and K *Traffic Barrier End Treatment* will be measured and paid for at the Contract unit price per each. Type L *Traffic Barrier Anchorage* will be measured and paid for at the Contract unit price per each.

614.04.03 Surface adjustment for Types B, C, D, E, and F *Traffic Barrier End Treatment* will be measured and paid for at the Contract unit price per cubic yard for the Surface Adjustment for Traffic Barrier End Treatment item. The payment will also include full compensation for furnishing, adjusting, and compacting embankment or aggregate material.

614.04.04 *Permanent Crash Cushion Sand Filled Plastic Barrels* will be measured and paid for at the Contract unit price per barrel. The payment will also include full compensation for furnishing and placing sand and antifreeze agent.

614.04.05 Repairs.

- (a) *Traffic Barrier End Treatment Spare Parts Package* furnished and installed will be measured and paid for at the Contract unit price per each for the type specified. The payment will also include full compensation for the clearing and removal of debris and damaged unsalvageable parts.
- (b) Spare parts packages not used will be paid for in conformance with Section GP-9.02. These packages shall be delivered to the Bureau of Highways as directed by the Engineer at which time they will become the property of Baltimore County.
- (c) When the County furnishes spare parts packages, *Repair Traffic Barrier End Treatment* will be measured and paid for at the Contract unit price per each for the type specified. The payment will also include full compensation for all transportation, reconnection to fixed objects where necessary, and clearing and removal of debris and damaged unsalvageable parts.
- (d) Payment will not be made for spare parts packages used for end treatments damaged due to the Contractor's operations.

614.04.06 The application of fusion bonded brown polyester coating, as well as all special handling, will not be measured but the cost will be incidental to the item to which the coating is applied.

SECTION 615 – CHAIN LINK FENCE

615.01 DESCRIPTION. This work shall consist of furnishing and erecting chain link fence as specified in the Contract Documents or as directed by the Engineer.

615.02 MATERIALS.

Concrete Mix No. 2	902.10.03
Fence Fabric	914.01
Tie Wires, Line Post Clips, Tension Wires and Tension Wire Clips	914.02
Posts, Braces, Fittings and Hardware	914.03
Gates	914.04
Barbed Wire	914.05

615.02.01 Type. The height and type of fence shall be as specified in the Contract Documents. When the type of fence is not specified, one of the following types may be used:

- (a) Galvanized steel and malleable iron components.
- (b) Galvanized steel fabric utilizing galvanized steel posts or aluminum line posts.
- (c) Aluminum coated steel fabric utilizing galvanized steel line posts.
- (d) Aluminum coated steel fabric utilizing aluminum line posts.
- (e) Bonded vinyl coated fabric utilizing galvanized steel or galvanized bonded vinyl coated steel line posts and fittings.
- (f) Bonded vinyl coated fabric utilizing aluminum line posts.

615.03 CONSTRUCTION.

615.03.01 General Requirements. The Contractor's activities and operations shall be confined to the area immediately adjacent to the right-of-way lines and within the right-of-way except that permission may be granted by the Engineer for normal construction activities through lands owned by or under control of the County.

In areas where any privately owned fence or other property is within the County's right-of-way, the Contractor shall remove the items and place them on the owner's property as directed by the Engineer. The Contractor shall be held responsible for any undue damage to privately owned items removed.

Fence lines as specified in the Contract Documents are only a guide and the exact location of the fence shall be determined in the field by the Engineer.

The bottom of the fabric shall be placed a nominal distance of 1 in. above the ground line, a maximum clearance of 6 in. will be permitted for a maximum horizontal distance of 8 ft except for special conditions as specified in the Contract Documents.

Any excavation or backfill required in order to comply with the above provisions shall be as approved by the Engineer. For roadway fencing projects the fence fabric shall be placed on the road side of the posts. For storm water management ponds the fabric shall be placed on the outside of the posts or the side farthest from the pond.

The fence shall be true and taut.

All posts shall be plumbed. The posts shall be spaced as uniform as practicable to the spacing as specified in the Contract Documents with a tolerance of minus 2 ft.

Terminal posts shall be installed at all ends, abrupt changes in grade and at changes in the horizontal alignment over 15 degrees. In no case shall the distance between terminal posts exceed 500 ft.

Post lengths shall be adequate in all cases to accommodate the fabricated width of the fence fabric without stretching or compressing the fabric and to obtain, as a minimum, the length required below the bottom of the fabric.

Post caps are required for all round line, terminal, and corner posts.

A tension wire shall be run continuously between terminal posts near the top and bottom of the fabric and attached to the fabric with hog ring fasteners at 18 in. intervals.

Horizontal brace rails with diagonal truss rods and turn buckles shall be installed at all terminal posts. Sufficient braces shall be supplied to permit complete bracing from each terminal post to all adjacent line posts.

Fabric shall be tied to brace rails at 2 ft maximum intervals and to posts at 12 in. maximum spacing. Stretcher bars shall be attached to terminal posts by connectors equally spaced at 16 in. centers maximum. Top and bottom connectors shall be as close as possible to the ends of the fabric.

615.03.02 Concrete Method. Posts shall be centered in the concrete footings. The concrete shall be thoroughly compacted around the post by rodding or vibrating. The finished top surface shall be troweled to a smooth finish slightly above the ground line and uniformly sloped to drain away from the post. The post shall not be disturbed in any manner within 72 hours after the individual post footing is completed.

Hand mixed concrete shall not be used without written permission from the Engineer. When permitted, the hand mixed batch shall not exceed 1/2 cu.yd.

Anchorage for Line Posts and Terminal Posts. Where rock is encountered at a depth less than the specified footing depth, a hole 1 in. larger than the greatest dimension of the post shall be drilled to a depth of 12 in. or to the planned footing depth, whichever is less. After the post has been set, the remainder of the drilled hole shall be filled with grout composed of one part Portland cement and two parts mortar sand by dry loose volume. The space above the rock shall be filled with concrete. The drive anchor blade method will not be allowed in rock areas, where all posts shall be set in concrete.

615.03.03 Drive Anchor Blade Method. This method shall not be used in rock.

- (a) The following alternate will be permitted in case of line posts only. After being driven in the ground, the line post shall be held rigidly upright by means of two galvanized steel drive anchor blades. Blades shall be driven diagonally through galvanized steel fittings attached to opposite sides of the post. The approximate spread of the blades at their full depth shall be 39 in. The top of the device shall be a minimum of 3 in. below the finished grade. The device and procedure shall be approved by the Engineer.
- (b) The following alternate will be permitted for terminal posts. After being driven into the ground, the terminal post shall be held rigidly upright by means of two anchor units spaced approximately 6 in. apart along the terminal post, and each anchor unit driven in a direction to offset the stresses caused by the tension of the fence wire. Galvanized steel drive anchor blades that are driven through galvanized steel fittings shall be attached to opposite sides of the post. The approximate spread of the blades at their full depth shall be 39 in. The top of the device shall be a minimum of 3 in. below the finished grade. The device and procedure shall be approved by the Engineer.

615.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The removal of privately owned fence or other property from within the County's right-of-way will not be measured but the cost will be incidental to the Contract lump sum price for ***Clearing and Grubbing***.

When an item for ***Clearing and Grubbing*** is not specified in the Contract Documents, ***Clearing and Grubbing*** will not be measured but the cost will be incidental to the Contract unit price per linear foot for the pertinent Chain Link Fence item.

615.04.01 Chain Link Fence will be measured and paid for at the Contract unit price per linear foot for the actual number of linear feet measured to centers of end posts for the height of fence and the mesh coating and color specified.

615.04.02 Terminal Posts (End, Pull and Corner Post) will be measured and paid for at the Contract unit price per each for the size and type specified.

615.04.03 Gates will be measured and paid for at the Contract unit price per each as complete units of the size and type specified.

SECTION 616 – WHEEL STOPS

616.01 DESCRIPTION. Furnish and install preformed wheel stops.

616.02 MATERIALS.

Concrete Mix No. 2	902.10
Reinforcement Steel	908.01
Recycled Composite Material	
Wheel Stops	As specified by the manufacturer

Recycled Composite Material. Wheel stops manufactured of recycled composite material shall be as specified by the manufacturer and be insect resistant.

The manufacturer shall furnish certification to the Engineer for approval.

616.03 CONSTRUCTION. Locate and secure wheel stops in place as specified. Only one type of wheel stop is permitted for each project.

616.04 MEASUREMENT AND PAYMENT. *Wheel Stops* will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

SECTION 617 – SHOULDER EDGE DROP-OFF GRADING ADJUSTMENT

617.01 DESCRIPTION. This work shall consist of constructing the area adjacent to the outside edge of the shoulder to eliminate the shoulder drop off.

617.02 MATERIALS.

Crusher Run Aggregate CR-6	901.01
Bank Run Gravel Subbase	901.01
Select Borrow	916.01.01
Common Borrow	916.01.04
Topsoil	920.01
Hot Mix Asphalt Millings Or Grindings	Size of individual particles shall be less than 2 inches as visually determined.

617.03 CONSTRUCTION. When the outside shoulder pavement edge exceeds 2-1/2 inches in height above the existing ground line, place the wedge shaped area graded to 4:1 slope and compacted as specified in the Contract Documents or as directed by the Engineer. The grading adjustment shall be completed by the end of the day that the dropoff is created and prior to opening to traffic.

The material, lines, and grades, and the cross section shall be as specified in the Contract Documents.

617.04 MEASUREMENT AND PAYMENT. *Crusher Run Aggregate CR-6, Bank Run Gravel Sub-base, Select Borrow, Common Borrow, Topsoil and Hot Mix Asphalt Millings or Grindings for Shoulder Edge Drop-Off* will be measured and paid for at the Contract unit price per ton, cubic yard or square yard, as specified in the Contract Documents. The payment will be full compensation for furnishing, hauling, placing, compacting, maintaining, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

When specified in the Contract Documents, turf establishment will be measured and paid for in conformance with Section 705.

SECTION 618 – SHOULDER RUMBLE STRIPS

618.01 DESCRIPTION. Grind or mill depressions into existing hot mix asphalt or Portland cement concrete to form rumble strips.

618.02 MATERIALS. Not applicable.

618.03 CONSTRUCTION. Place rumble strips as specified.

Grind or mill the rumble strips into hot mix asphalt (HMA) at a rate of at least 4000 strips per hour. Grind into Portland cement concrete at a rate of at least 1000 strips per hour.

Equipment. The equipment shall have rotary type cutting heads with a length of 16 in. and an outside diameter not greater than 24 in. The cutting heads shall have the cutting tips arranged in a pattern providing a relatively smooth cut (approximately 1/16 in. between peaks and valleys).

The cutting heads shall be mounted on their own suspension, independent of the power unit, to allow the tool to self-align with the slope of the shoulder and any irregularities in the shoulder surface.

The cutting tool shall be equipped with guides to provide consistent alignment of each cut in relation to the roadway and to provide uniformity throughout the project. The Engineer will randomly check the pattern edge alignment.

Control Strip. Grind a control strip at least 100 ft. in length to demonstrate that the speed of operation, dimensions, and texture are acceptable.

Clean up. Sweep or vacuum the work area before reopening the roadway to traffic. Do not sweep the material to the side of the road.

618.04 MEASUREMENT AND PAYMENT. *Rumble Strips* will be measured and paid for at the Contract unit price per linear foot as measured along the shoulder or center line where the rumble strips are actually placed. Payment will be full compensation for all installation of rumble strips, cleaning and disposal of waste material, control strips, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

SECTION 619 – DETECTABLE WARNING SURFACES

619.01 DESCRIPTION. Furnish and install detectable warning surfaces within sidewalk ramps and at other locations specified on Plans, Special Provisions and as directed by the Engineer. The detectable warning surface shall be in accordance with the most recent accessibility guidelines of the Americans with Disabilities Act (ADA).

619.02 MATERIALS.

Detectable Warning Surfaces

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Select the detectable warning surface from the prequalified list maintained by the MdSHA. Ensure that detectable warning surface materials meet certification requirements prior to use. Submit the proposed source of supply, the specific product for approval and the means of removal of any existing detectable warning to the Engineer. The Engineer's approval is required prior to commencement of construction involving Detectable Warning Surfaces.

619.03 CONSTRUCTION. The detectable warning system may be either surface applied or cast in place. However, use only Type I, III, or IV detectable warning systems for new or replacement concrete installations. Install the system according to the manufacturer's

recommendations. Unless specifically addressed in the manufacturer's recommendations, remove the existing surface texturing by grinding or other means. At a minimum, prepare the concrete surface in accordance with SSPC-SP 13. Remove all old adhesives and sealants.

The detectable warning surface shall be 24 in. wide in the direction of pedestrian travel and installed for the full width of the curb ramp, landing, or blended transition. Do not bridge or overhang cracks or expansion joints.

Ensure that the vertical edges of the installed system are not more than 0.50 in. above the adjacent surfaces. Place a 2:1 or flatter bevel on edges that are more than 0.25 in. above the adjacent surface. The same edge requirements apply to cut material.

619.04 MEASUREMENT AND PAYMENT. *Detectable Warning Surfaces* will be measured and paid for at the Contract unit price per square foot. The payment will be full compensation for removal and disposal of old treatments, including cast-in-place warnings, adhesives and sealants, reapplying, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The sidewalk on which the detectable warning surface is placed will be measured and paid for at the Contract price for the pertinent *Sidewalk* item.

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