

## **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 204.03.

The Contractor shall provide and employ a shoulder template to ensure uniformity of the shoulder surfaces. The finishing operations shall conform to 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, and Hot Mix Asphalt (HMA) curb as specified in the Contract Documents or as directed by the Engineer.

**609.02 MATERIALS.**

Curing Materials	902.07
Form Release Compound	902.08
Concrete Mix No. 2	902.10.03
Hot Mix Asphalt	904
Tack Coat	904.04
Reinforcement Steel	908.01
Joint Sealer	911.01
Preformed Joint Filler	911.02

**609.03 CONSTRUCTION.**

**609.03.01 Concrete Curb, Combination Curb and 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 A, 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 (3 m) long. When installation is made along curves where the radius of the curb face is less than 200 ft (60 m), flexible or curved steel or wooden forms shall be used. Form sections shall not be more than 6 ft (2 m) 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. (6 mm) in 10 ft (3 m) 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 610.03.01(b)(2).

(c) **Concreting.** Concrete shall be mixed in conformance with 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 outletting rain spout water or other drainage 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. (6 mm) edging tool except the face edge of curb shall have a 1 in. (25 mm) 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. (6 mm) per 10 ft (3 m). 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 (3 m) 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 (1 m). The joints shall be formed by using plate steel templates which are 1/8 to 3/16 in. (3 to 5 mm) 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. (13 mm) preformed expansion joint filler. Expansion joints shall be constructed at a maximum of 100 ft

(30 m), 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.

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

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

(i) **Backfill.** After the forms have been stripped and any necessary repairs are satisfactorily completed, the spaces in front and back of the curb, combination curb and gutter, and median shall be backfilled to the required elevations using suitable material prior to any adjacent roadway rolling.

**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 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. The backfill shall be consolidated by tamping or rolling.

**609.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for all concrete, Hot Mix Asphalt, forms, excavation, backfill, disposal of excess material, drainage openings, joint sealer, 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 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.

**609.04.02** Concrete Curb 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 Borrow or Selected Backfill using No. 57 Aggregate or Selected Backfill using Crusher Run Aggregate CR-6 is authorized by the Engineer 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. Three-inch diameter plastic sewer pipe will be included in the cost of curb and gutter.

## **SECTION 610 - SIDEWALKS**

**610.01 DESCRIPTION.** This work shall consist of constructing Hot Mix Asphalt (HMA) or concrete sidewalks as specified in the Contract Documents or as directed by the Engineer.

## 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

## 610.03 CONSTRUCTION.

### 610.03.01 Concrete Sidewalks.

(a) **Excavation.** Refer to 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 611.03.01(b), except that joint construction shall conform to paragraph (e) of this Sub-section.

(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 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. (6 mm) 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. (18 mm) deep.

Expansion joint material shall extend the full depth of the concrete.

**(f) Cold Weather Protection and Curing.** Refer to 520.03.02 for cold weather protection and to 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 610.03.01(a) and (b).

**(b) Placement.** HMA Sidewalk shall conform to 504.03.05. When the sidewalk is not formed, backfill material acceptable to the Engineer shall be used to form an 18 in. (460 mm) 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 material shall be obtained from excavation for the sidewalk or from other areas, borrow, or selected backfill as directed by the Engineer.

**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 as shown on Baltimore County Standard Detail Plate R-36, and 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 will be measured and paid for at the Contract unit price per square foot of finished surface.

**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 Borrow or Selected Backfill using No. 57 Aggregate or Selected Backfill using Crusher Run Aggregate CR-6 is authorized by the Engineer 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.

## **SECTION 611 - CONCRETE TRAFFIC BARRIERS**

**611.01 DESCRIPTION.** This work consists of constructing concrete traffic barriers specified in the Contract Documents or directed by the Engineer.

## 611.02 MATERIALS.

Curing Materials	902.07
Form Release Compound	902.08
Concrete Mix No. 2	902.10.03
Concrete Mix No. 6	902.10.03
PVC Pipe	905
Reinforcement Steel	908
Preformed Joint Fillers	911.02

All concrete traffic barriers, end transitions, and footers shall be constructed using concrete mix No. 6 unless otherwise specified in the Contract Documents. Before beginning work, the Contractor shall construct a sample panel approximately 2 ft X 2 ft X 3 in. (0.6 m X 0.6 m X 75 mm) using the proposed concrete mix design. After 28 days, the concrete shall be no darker than Federal Standard No 595, Color 37722. The Contractor shall submit the panel and mix design to the Regional Engineer for approval. The approved sample panel shall remain on the construction site and be used by the Engineer to compare the color of the concrete barrier to the sample panel for adjustments and approval.

A sample panel for each source of supply shall be submitted for approval prior to use.

**611.03 CONSTRUCTION.** Concrete barriers shall be cast-in-place. Excavation for concrete barriers shall be made to the required depth and to a width that will permit the installation and bracing of forms where necessary. The Contractor shall remove all soft and unsuitable material and replace with suitable material as directed by the Engineer. The subgrade shall be properly shaped and compacted in conformance with Section 208.

**611.03.01 Concrete Barriers.** Forming may be either the fixed form or the slip-form method.

- (a) **Fixed Form Method.** Forms shall be steel and meet the required tolerance of deviations not exceeding 1/4 in. (6 mm) in 10 ft (3 m) in either grade or alignment. For bifurcated and transition sections, other forming materials may be used as directed by the Engineer.

Before concrete is placed against the forms, they shall be thoroughly cleaned and coated with a form release compound each time they are used.

Concrete mixing shall conform to 915.03.04 and placing to Section 414. Volumetric batching and continuous mixing will be permitted. Concrete shall be vibrated by means of an approved immersion type mechanical vibrator.

Construction or contraction joints shall be sawed or formed at 20 ft (6 m) intervals with a minimum of 10 ft (3 m). The time of sawing shall be as specified in 520.03.14(c)(1). Expansion joints shall be placed where specified in the Contract Documents or as directed by the Engineer. All joints in footers and walls shall align.

Concrete finishing shall conform to 611.03.03 except that the surface shall be broom finished when forms are stripped in less than 24 hours. Face forms shall be removed for finishing as soon as the concrete can retain its shape.

All honeycombed and damaged areas shall be repaired immediately after the removal of the forms in a manner acceptable to the Engineer.

- (b) Slip-form Method.** Slip-form equipment shall be approved by the Engineer and include the incorporation of automatic guidance controls to follow the line and grade references. On vertical and horizontal curves, an additional intermediate support shall be set in the field to establish a reference line acceptable to the Engineer. The use of ski or shoe sensors reflecting variations in the grade of the existing roadway surface will not be permitted.

Concrete mixing shall conform to 915.03.04. The concrete shall be of such consistency that after extrusion, it shall maintain the shape of the barrier without support. Slip form equipment shall include internal vibrating capability. The surface shall be free of surface pits larger than 3/16 in. (5 mm) diameter. The concrete shall require no further finishing other than broomed finish.

If during the operation of the slip-form equipment a tear occurs, it shall be repaired immediately or removed and replaced as directed by the Engineer.

Construction or contraction joints shall be sawed or formed at 20 ft (6 m) intervals in the barrier and footer with a minimum of 10 ft (3 m), except in the area of miscellaneous structures 6 ft (2 m) will be permitted. Sawed joints shall be a minimum of 2 in. (50 mm) deep and 1/8 in. (3 mm) wide. Expansion joints shall be as specified in the Contract Documents or as directed by the Engineer.

The concrete footer shall be constructed using the fixed form or the slip-form method. Constructing the footer and the barrier section monolithically is prohibited.

**611.03.02 Curing.** Concrete curing and protection shall conform to Section 414.

**611.03.03 Finished Surface.** Finishing concrete shall conform to Section 414. The completed barrier shall not vary more than 1/4 in. (6 mm) in 10 ft (3 m) from the horizontal and vertical lines specified in the Contract Documents or as approved by the Engineer. It shall present a smooth, uniform appearance.

**611.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for all concrete, test panels, excavation, disposal of excess or unsuitable material, concrete footer, reinforcement, 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.

**611.04.01** Concrete Traffic Barriers will be measured and paid for at the Contract unit price per linear foot 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** The removal and disposal of unsuitable material in cut sections 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.

**611.04.04** When Borrow or Selected Backfill using No. 57 Aggregate or Selected Backfill using Crusher Run Aggregate CR-6 is authorized by the Engineer 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.

## **SECTION 612 - METAL TRAFFIC BARRIERS**

### **612.01 DESCRIPTION.**

- (a) New Metal Traffic Barrier and End Treatments
- (b) Replacing or repairing Traffic Barrier Unmet Treatments
- (c) Replacing normal length posts, installing additional normal length posts, installing long posts, splice and replacing “W” Beam Panel.
- (d) Removal and Disposal of Existing Traffic Barrier.
- (e) Remove and reset existing traffic barrier.
- (f) Installing reflective delineators

All as specified in the Contract documents or as directed by the Engineer.

### **612.02 MATERIALS.**

Concrete Mix No. 2	902.10.03
Brown Polyester Coating	917.03
W Beam	918.01

End Treatment and Spare Parts Package	918
Metal Posts	918.02
Traffic Barrier Hardware	918.03
Timber Posts	918.04
Wire Rope	918.05
Rub Rail	A36, Galvanized A 123
Thrie Beam	M 180 Class A Type 2
Reflective Delineators	As approved by the Engineer

### **612.03 CONSTRUCTION.**

**612.03.01 Post Erection.** Posts shall be driven unless otherwise permitted by the Engineer. The method of driving shall avoid battering or distorting the posts. Posts not driven shall be set in by hand or in mechanically dug holes of sufficient diameter to allow tamping of the backfill. Postholes shall be backfilled with acceptable materials placed in horizontal layers not to exceed 6 in. (150 mm) loose depth, then thoroughly compacted. When it is necessary to place posts in existing paving, all loose material shall be removed and the paving replaced. Prior to erection of the rail or cable elements, the post shall be properly aligned and be within a 1/4 in. (6 mm) tolerance of line and grade. Posts shall be plumb.

If rock is encountered, construction shall conform to 615.03.02.

**612.03.02 Rail Assembly.** Rail elements shall conform to the Contract Documents and be erected in a manner resulting in a smooth, continuous installation with laps in the direction of traffic flow. All bolts shall be drawn tight.

**612.03.03 Concrete Curing.** Concrete curing and protection shall conform to Section 414.

**612.03.04 Brown Polyester Coated Traffic Barrier.** All components shall be padded and shall be handled with nylon slings during loading, unloading and installation.

The Contractor shall preserve the integrity of the polyester coating. If the polyester coating is chipped, scratched, blistered or otherwise separated from the base metal, the Contractor shall repair the damaged areas using the repair kit supplied by the manufacturer. All repairs shall be completed to the satisfaction of the Engineer.

**612.03.05** Reflective Delineators shall be installed on the traffic barrier as specified.

**612.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for all rock excavation, components, restoration of grassed or paved areas, drilled post holes, concrete, assembly and erection of all component parts and materials complete in place, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**612.04.01** Metal Traffic Barriers will be measured and paid for at the Contract unit price per linear foot with terminals as specified in the Contract Documents.

**612.04.02** End Flares, End Anchorages and other treatment will be measured and paid for at the Contract unit price per each.

**612.04.03** Repairing Traffic Barrier End Treatments to their original configuration will be measured and paid for at the Contract unit price per each spare parts package as specified in the Contract Documents.

Spare parts packages not used for repairs will be delivered to the district shop as directed by the Engineer at which time they will become the property of the Administration. Measurement and payment will conform to GP-4.07.

**612.04.04** Brown Polyester Coated Traffic Barrier will be measured and paid for at the Contract unit price per linear foot.

**612.04.05** Brown Polyester Coated End Flares, End Anchorages, and other treatment for Brown Polyester Coated Metal Traffic Barriers will be measured and paid for at the Contract unit price per each.

**612.04.06** 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.

**612.04.07** Replacing Normal Length Posts, Installing Additional Normal Length Posts, Installing Long Posts, Splice Joints and Replacing W Beam Panel will be measured and paid for at the Contract unit price as specified in the Contract Documents.

**612.04.08** Removal and Disposal of Existing Traffic Barrier will be measured and paid for at the Contract unit price per linear foot.

**612.04.09** Remove and Reset Existing Traffic Barrier will be measured and paid for at the Contract unit price per linear foot.

**612.04.10** Replace End Flares, End Anchorages, or other end treatment and Reflective Delineators will be measured and paid for at the Contract unit price per each. Removal of the specific end treatment to be replaced will not be measured but the cost will be incidental to the End Treatment item in the Invitation for Bids.

## **SECTION 613 - SPECIAL TRAFFIC BARRIER W BEAM END TREATMENT**

**613.01 DESCRIPTION** This work shall consist of installing a special traffic barrier W beam end treatment where specified on the plans or where directed by the Engineer. Each of these systems is proprietary.

The bidder shall indicate on the appropriate sheet in the Schedule of Prices the type of end treatment that his bid is based on. Only one type of end treatment per project is allowed.

The type of end treatment will be one of the three listed below.

- (a) Brakemaster System (BRS)
- (b) Crash Cushion/Attenuating Terminal (CAT)
- (c) ET-2000



When specified, a spare parts package will be required for the type of end treatment upon which the bid is based.

The color of the traffic barrier W Beam and the end treatment shall be the same. Mixing colors is prohibited.

### **613.02 MATERIALS**

End Treatments and Spare Parts Packages	As Specified by the Manufacturer
Bank Run Gravel Base	Table 901 A & 901 B

**613.03 CONSTRUCTION** These systems are not designed to be curved. The length of the system as indicated on the plan shall be installed in a straight line. For installation on tangent and curved roadways refer to the manufacturer’s recommendations.

The ET-2000 shall have a nose cone. The color of the cone shall be gray when galvanized traffic barrier is used and shall be the color brown when brown polyester-coated traffic barrier is used.

**613.03.01 Grading** The area surrounding the end treatment shall be re-graded to the slopes as indicated on the standard drawing using Bank Run Gravel Base. Compaction is not required.

**613.04 MEASUREMENT AND PAYMENT.** The special Traffic Barrier W Beam End Treatment will be measured and paid for at the Contract unit price per each. The payment will be full compensation for the completed system as indicated on the plans, including excavation, driving posts, additional drilled holes, backfilling, concrete, grading, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Repairing damaged end treatments to their original configuration will be measured and paid for at the contract unit price per each for the Spare Parts Package for Special Traffic Barrier W Beam End Treatment. The damaged parts that are replaced shall be removed from the job site and become the

property of the Contractor. The payment will be full compensation for all material , labor, equipment, tools, and incidentals necessary to complete the work.

Spare parts packages not used will be paid for in conformance with TC-7.03. These packages shall be delivered to the SHA District shop as directed by the Engineer and become the property of the Administration.

**613.04.01 Bank Run Gravel Base.** The Bank Run Gravel Base will be measured and paid for at the Contract unit price per ton. The payment will be full compensation to regrade the area to the limits and slopes as indicated on the standard drawing and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

## **SECTION 614 — PERMANENT CRASH CUSHION TELESCOPING ATTENUATOR**

**614.01 DESCRIPTION.** This work shall consist of furnishing, and installing a telescoping attenuator as specified in the Contract Documents or as directed by the Engineer.

**614.02 MATERIALS.** Each telescoping attenuator shall consist of a number of predetermined individual cartridges, miscellaneous metalwork, diaphragms, fender panels, a backup system, base pad, anchor device, and a nose device as specified in the Contract Documents or as directed by the Engineer.

**614.03 CONSTRUCTION.** The attenuator shall be installed and securely anchored as specified in the manufacturer's recommendations.

The nose section on the telescoping attenuator shall be reflectorized as specified in the Contract Documents.

**614.04 MEASUREMENT AND PAYMENT.** Permanent Crash Cushion will be measured and paid for at the Contract unit price per each type specified in the Contract Documents. The payment will be full compensa-

tion for all excavation, backfill, base pad, hardware, anchoring devices, reflectorized nose section, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

## 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 Administration.

In areas where any privately owned fence or other property is within the Administration'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. (25 mm) above the ground line, a maximum clearance of 6 in. (150 mm) will be permitted for a maximum horizontal distance of 8 ft (2 m) 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 (-0.6 m).

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 (150 m).

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. (460 mm) 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 (610 mm) 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. (406 mm) centers maximum. Top and bottom connectors shall be as close as possible to the ends of the fabric.

**615.03.02 Concrete.** 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 yd<sup>3</sup> (0.4 m<sup>3</sup>).

Where rock is encountered at a depth less than the specified footing depth, a hole 1 in. (25 mm) larger than the greatest dimension of the post shall be drilled to a depth of 12 in. (300 mm) 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 alternate anchor method will not be allowed in rock areas, where all posts shall be set in concrete.

### **615.03.03 Alternate Anchorage for Line Posts and Terminal Posts.**

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. (1 m). The top of the device shall be a minimum of 3 in. (75 mm) 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. (150 mm) 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 which 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. (1 m). The top of the device shall be a minimum of 3 in. (75 mm) 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 Administration'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.

**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 - PRECAST CONCRETE WHEEL STOPS**

**616.01 DESCRIPTION.** This work shall consist of furnishing, placing, and anchoring precast concrete wheel stops as specified in the Contract Documents or as directed by the Engineer.

### **616.02 MATERIALS.**

Concrete Mix No. 2	902.10.03
Reinforcement Steel	908.01

The manufacturer shall furnish certification as specified in TC-1.02.

**616.03 CONSTRUCTION.** Precast concrete wheel stops shall be located and secured in place as specified in the Contract Documents.

**616.04 MEASUREMENT AND PAYMENT.** Precast Concrete 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.

## **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

**617.03 CONSTRUCTION.** When the outside shoulder pavement edge exceeds 2 in. in height above the existing grade line the wedge shaped area shall be filled and the material compacted as specified in the Contract Documents or as directed by the Engineer. The grading adjustment shall be completed within seven calendar days from the time the shoulder was constructed and the drop off was created.

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 Subbase, Select Borrow, Common Borrow, and Topsoil 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.