

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
2010 EDITION

# TYPICAL SECTIONS AND RELATED DETAILS

August 1, 2013 Revisions Included

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\* Partial Depth Repair  
Added 8/1/13



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

1900 Kanawha Boulevard East • Building Five • Room 110  
Charleston, West Virginia 25305-0430 • (304) 558-3505

Earl Ray Tomblin  
Governor

Paul A. Mattox, Jr., P. E.  
Secretary of Transportation/  
Commissioner of Highways

August 23, 2012

MEMORANDUM

**TO:** ALL HOLDERS OF TYPICAL SECTIONS AND RELATED MATERIALS

**FROM:** Gregory L. Bailey, P. E. *GLB*  
Director  
Engineering Division

**SUBJECT:** Concrete Repair Details

Enclosed for your use and further handling are copies of the following revised Concrete Repair Details:

1. Concrete Repair Details Sheets 1 of 6, 2 of 6, 3 of 6, 4 of 6, 5 of 6, and 6 of 6.
2. Partial Depth Repair Detail.

Should you require any additional information, please contact Mr. Denny Alderson of this office at (304) 558-9679 or by email at [Dennis.R.Alderson@wv.gov](mailto:Dennis.R.Alderson@wv.gov).

GLB:Fjd

Attachment

cc: DDI(DA), DDC(TGW), DD(MF)



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

**Division of Highways**

1900 Kanawha Boulevard East • Building Five • Room 110  
Charleston, West Virginia 25305-0430 • (304) 558-3505

Earl Ray Tomblin  
Governor

Paul A. Mattox, Jr., P. E.  
Secretary of Transportation/  
Commissioner of Highways

March 19, 2012

**MEMORANDUM**

**TO: ALL HOLDERS OF TYPICAL SECTIONS AND RELATED DETAILS**

**FROM: Gregory L. Bailey, P. E.** *Gregory Bailey*  
**Director**  
**Engineering Division**

**SUBJECT: Piling Details**

Enclosed for your use and further handling and copies of the following revised **Piling Details**:

1. Piling Details Sheets 1 of 3, 2 of 3, and 3 of 3.
2. Precast Concrete Lagging.

Should you require any additional information, please contact Mr. Denny Alderson of this office at (304) 558-9679 or e-mail at [Dennis.R.Alderson@wv.gov](mailto:Dennis.R.Alderson@wv.gov).

GLB:c

Attachments

## **INTRODUCTION**

The applicable pages of the 2010 edition "Typical Sections and Related Details" are to be used in preparing plans for both contract and state work. For use in resurfacing projects, copies of these convenient 8 1/2" x 11" sheets can be inserted into the contract document as applicable. For more complex projects where full-size plans are required, the applicable typical sections can be transferred onto a 22" x 34" linen or mylar. These sections and details are intended for use in probably 95% of the 3R type highway projects; however, changes and/or exceptions will occur and should be developed jointly with Engineering Division or District Design Engineer. Additional sections will appear in subsequent issues of this book.

## **GENERAL INFORMATION**

A numbering sequence has been assigned to various items in the legends to retain consistency throughout and to avoid duplication. Blank spaces have been provided for certain items such as widths, thicknesses, rates of application, aggregate items and classes, etc.

## **DITCHES**

It is the Design Policy of the Division to divert water from the pavement. The desirable ditch in-slope should be 4:1 or flatter with the ditch bottom 6" lower than the subgrade.

When the proper ditch requirements cannot be met the alternative to using a ditch section is a non-ditch section with proper drainage of the subbase. These typicals may be modified to accommodate a non-ditch section. If a non-ditch section is provided, the contract documents are to be accompanied by an explanation of the factors involved, such as traffic volume, right-of-way requirements, and cost differences.

## **EMBANKMENTS**

Fill slopes are to be 2:1 or flatter for adequate soil stability. Where the height of the fill is 10' or less, it is desirable to flatten the slope to 4:1 or flatter if possible. When a 1 1/2:1 fill slope is required the embankment must be constructed of rock (select embankment or rock borrow excavation). Sliver fills require benching to provide stability and to allow compacting by equipment. Fill benching (Pages 36 -39) should be considered from the first feasibility study to the final plans as it can be a substantial cost item.

## **SHOULDER WIDTHS**

Shoulder widths on certain typical sections, where indicated, are to be designated as maximum and minimum. In some cases, the two dimensions are equal because of non-varying widths. The designer shall measure the shoulder widths and specify the maximum and minimum to ensure proper quantity calculations and to assure that the full width is stabilized by the addition of stone. The existing and available shoulder widths are to be preserved. On projects where shoulder widths are predominantly less than two feet, the shoulders should be paved and edge striping is to be placed at the previous pavement edge.

## **SHOULDERS AND DITCHES**

In extreme erosion areas, ditches may require rock borrow excavation as shown on Page 30 "Correcting Deep Ditches." Correcting of ditch depth is in the interest of safety, but flowline of ditches should be maintained to provide a minimum 6" of freeboard for effective road drainage.

## **SHOULDER RECONSTRUCTION**

Appropriate shoulder reconstruction details shall be included with the resurfacing typical section in the contract plans. Shoulders can become too steep by successive resurfacing, erosion, or ditch cleaning operations and should be restored to an appropriate slope. Repairs may require rock borrow excavation or gabions to prevent stream or right-of-way encroachment. Shoulders are to be restored with stone or pavement to a height equal to the finished roadway.

# INTRODUCTION AND GENERAL INFORMATION

### **DRIVEWAY AND SIDEROAD TREATMENT**

The intent of this detail is to assure, during resurfacing operations, proper treatment of driveways and sideroads to maintain safe vehicle operation on the main road. On paved driveways and sideroads, a minimum amount of HMA is usually necessary to avoid an elevation difference (drop off) at the pavement edge. The intent is not to pave every unpaved approach.

It is the designer's responsibility to recognize existing and potential problem approaches. They are to be listed in the table provided and included in the contract documents. If more space is required, additional tables shall be provided. All problem approaches shall be documented with proper justification in the project file.

Underdrain or fabric drain is to be installed where approaches have caused pavement distress by trapping water.

### **BASE FAILURE REPAIR**

Identify in the contract documents, all areas of base failure that are to be repaired.

### **HMA SKID RESISTANT PAVEMENT**

All Hot-Mix Asphalt wearing course must be a skid-resistant mix in accordance with DD-644. If a project has severe curvature, high wet accident data, or high frictional demand, skid-resistant pavement may be required and should be documented in the project file

### **WINTER GRADE PATCHING REMOVAL**

The designer should determine the extent and condition of any winter grade patching material that is to be resurfaced in a particular project. Any such material, which would be detrimental to the new surface, is to be removed and replaced with Hot-Mix Asphalt. If any removal is necessary the plans shall indicate an approximate quantity and method for pavement repair.

### **ADJUSTING MANHOLES, INLET GRATES, AND VALVE BOXES**

Many objects, such as manholes, gas and water valves, ect; must be adjusted for a smooth riding surface. When utility companies own such items the Designer will coordinate with the District Utilities Supervisor to determine all intended work and the required amount of adjustments. If certain utilities are not capable of the adjustments prior to the start of the work it shall be included in the contract. If it is determined by the District Utilities Supervisor that the work is to be reimbursed by the affected utility company the Designer shall prepare a separate engineer's estimate for each utility company and include them with the normal engineer's estimate when the P.S. & E. package is submitted to the Program Administration Division.

### **MATERIALS**

Testing of material may be waived on minimum usage items. The designer should make this determination on a project by project basis and so note on the appropriate plan sheets or in a general note.

### **GUARDRAIL**

The class of guardrail to be installed on a particular project shall be as specified by the current Design Directive, DD-622. When the top of the guardrail is less than 24" or greater than 30" above the finished grade, the guardrail shall be removed and reset to the correct height, as per standard details, in conjunction with adjacent work.

## INTRODUCTION AND GENERAL INFORMATION

### **GUARDRAIL INSTALLATION ON HEADWALLS, PARAPETS, BOX CULVERTS, AND BRIDGES**

Many bridge parapets have intermediate vertical faces that can catch vehicles and cause damage. It is the policy of the Division to remove or isolate these hazards. The intent is to avoid guardrail installations where a lack of connection to the structure allows vehicles to deflect the rail and hit the concrete. The purpose of these details is to provide safe methods of guardrail installation where existing headwalls and/or parapets presents a hazard to vehicles. However, there are certain physical limitations that may require such structures to remain. Before guardrail is added to a structure a comparison should be made to determine the feasibility of removing the obstruction and extending the culvert rather than installing guardrail. In many cases it is safer to install guardrail along the length of the parapet to minimize vehicle contact.

These details, which are to be inserted into the contract document, include a table that should be used to specify locations, lengths, class of guardrail and quantities of various appropriate end treatments, unless such information is shown in full-size plans for the projects.

The details should be applicable in the majority of situations where existing headwalls and bridge parapets are to remain. Certain bridges will require special consideration and design. Modifications of these details may be made for a project only after approval by the Engineering Division.

### **GUARDRAIL PLACEMENT AT INTERSECTIONS**

Details for guardrail placement at intersections are to be included in the plans to ensure well defined end points for guardrail end terminals. The designer is to add information such as the A, B, and C dimensions, the end treatment (TET, FET, CST, or buffer end), and the approximate milepost (or station) of the intersection in the spaces provided. Some intersections will require more than one detail sheet where guardrail is to be installed in more than one quadrant.

#### **The following is a list of considerations in specifying guardrail:**

1. TET, FET, and CST end treatments are most commonly used.
2. Errant vehicles normally leave the roadway at an angle of 8° or less.
3. The departure must also be considered for the traffic movement in the opposite direction on the other side of the highway, but the near side would normally be more critical.
4. It is desirable to extend the guardrail around the intersecting roadway radius to move the end away from the mainline traffic.
5. The ending point of the guardrail must be established considering the departure, the significance of a roadside hazard adjacent to the roadway and the available right-of-way.
6. If the guardrail end is within the angle of departure, a FET, TET, or CST is required.
7. If the guardrail can be extended around the radius to outside the departure angle, the need for an end treatment for the intersecting must be considered. If the guardrail can be extended around the radius enough to develop strength for the guardrail adjacent to the mainline, a buffer end is adequate.
8. Additional data may be found in Design Directive 662.

### **MODIFIED CUT SLOPE TERMINAL**

This detail should only be used on 3-R type projects where a cut slope terminal is desired but the cost of drainage modifications through the cut slope area is not economical. If the existing ditch is more than 18" below the required grade for a CST, the ditchline will need adjusted.

### **MODIFIED CONCRETE END POST**

This detail is to be used on NHS 3-R type projects to upgrade existing bridge end posts to a shape which will accept the Thrie Beam Guardrail Bridge Transition and Connection as per Standard Detail GR11.

The designer should determine if non-NHS end posts should be upgraded based upon the specific location with emphasis on the probability of impact, traffic data, etc.

## INTRODUCTION AND GENERAL INFORMATION

**TEMPORARY TRAFFIC CONTROL PLAN**

The temporary traffic control plan (applicable page 25 or 26) can be used on most resurfacing, widening, and stabilization projects. If the project contains work beyond the scope of the resurfacing temporary traffic control plan the designer shall develop a more appropriate, detailed temporary traffic control plan.

Additional signs or devices needed are to be listed on the table in the temporary traffic control plan and the unit values for the additional signs are to be obtained from Section 636 of the Specifications.

The manual "Temporary Traffic Control For Streets And Highway's 2006 Edition" is to be used for additional methods of traffic control and promotion of safety through the work area.

**INSTALLATION OF HAZARD PANELS**

Hazard panels are to be installed within the clear zone of the project when it is not feasible to remove or isolate the hazards with guardrail. Hazard panels are to be installed at headwalls, box culverts and bridge parapets protected by guardrail whenever the bridge shoulder widths are 8 feet or less.

The designer is to designate locations of the panels and delineators in the table on the appropriate detail pages.

**RECONSTRUCTING ROADWAY AND SHOULDERS USING ADDITIONAL AGGREGATE**

The existing surface shall be scarified to a depth of 2 inches. When existing shoulders are sloped steeper than the nominal 1/4 in. per ft. (6%), the existing shoulder material shall be shaped to achieve that slope prior to addition of aggregate.

Subgrade soil or ditch soil shall not be mixed with the loosened material. The loosened material shall then be broken and reshaped to form a uniform grade and cross section.

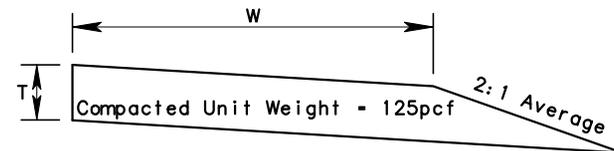
The additional material for roadway/shoulder reconstruction shall then be spread evenly over the surface so formed in an amount sufficient to provide a compacted thickness equal to the thickness shown on the Plans or as directed by the Engineer. The loose surface of the reconstructed roadway shall then be carefully shaped and brought to the proper grade and cross section by use of a blade grader or other equipment as may be required.

**CALCULATION OF SHOULDER STONE**

The table below is to be used on projects for the calculation of shoulder stone. It must be remembered that aggregate is to be placed on the full width of existing shoulders up to a maximum of 10 feet on resurfacing projects and that thickness is normally more than that of HLBC resurfacing. Field measurements are required.

SHOULDER STONE IN TONS PER MILE - BOTH SIDES

T\W	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'
3"	206	370	536	701	866	1031	1196	1361	1526	1694
4"	294	513	733	954	1173	1393	1614	1833	2053	2274
6"	495	825	1155	1485	1815	2145	2475	2805	3135	3465
8"	735	1173	1614	2053	2493	2934	3373	3813	4254	4693
10"	1008	1558	2109	2658	3208	3759	4308	4858	5409	5958
12"	1320	1980	2640	3300	3960	4620	5280	5940	6600	7260

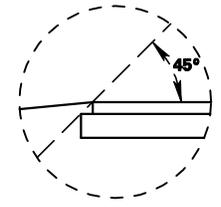
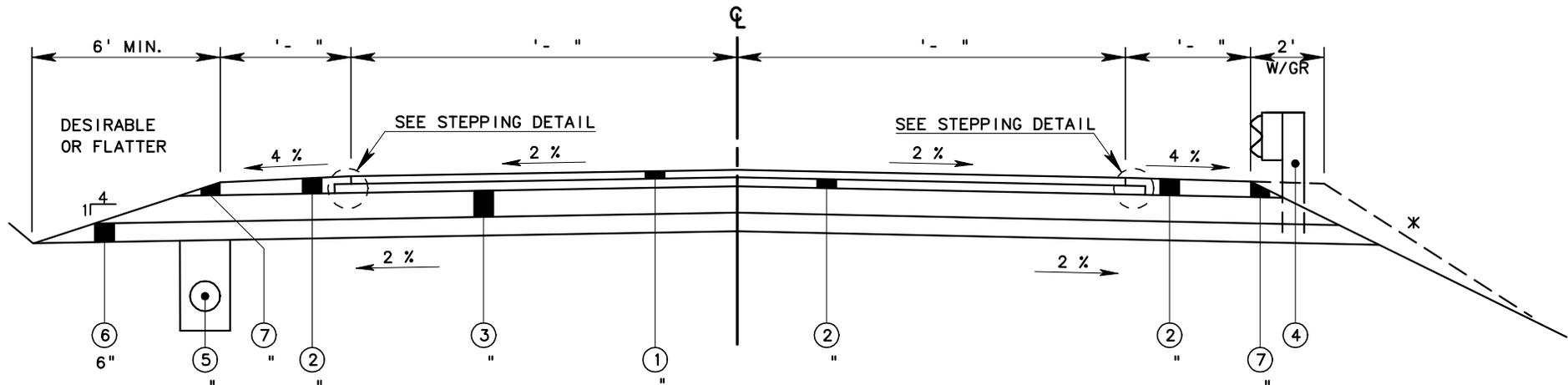


$$Q = 2 \times 5280 \times 125 \div 2000 \times (W+T)$$

$$Q = 660 (WT+T)$$

Example: 1.17 miles (T=4, W=3) @ 733 = 858  
 1.73 miles (T=4, W=8) @ 1833 = 3171  
 0.62 miles (T=6, W=10) @ 3465 = 2148  
 Project Total 3.52 miles 6177 Tons

**INTRODUCTION AND GENERAL INFORMATION**



STEPPING DETAIL

**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT, STONE OR GRAVEL, TYPE OR  
ITEM 40 -002, HOT-MIX ASPHALT, SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 307001-00, AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 606025-, INCH UNDERDRAIN PIPE OR  
ITEM 606020-001, FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS.
- ⑥ ITEM 207002-000, SUBGRADE
- ⑦ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR  
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10

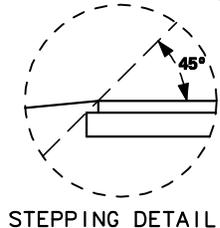
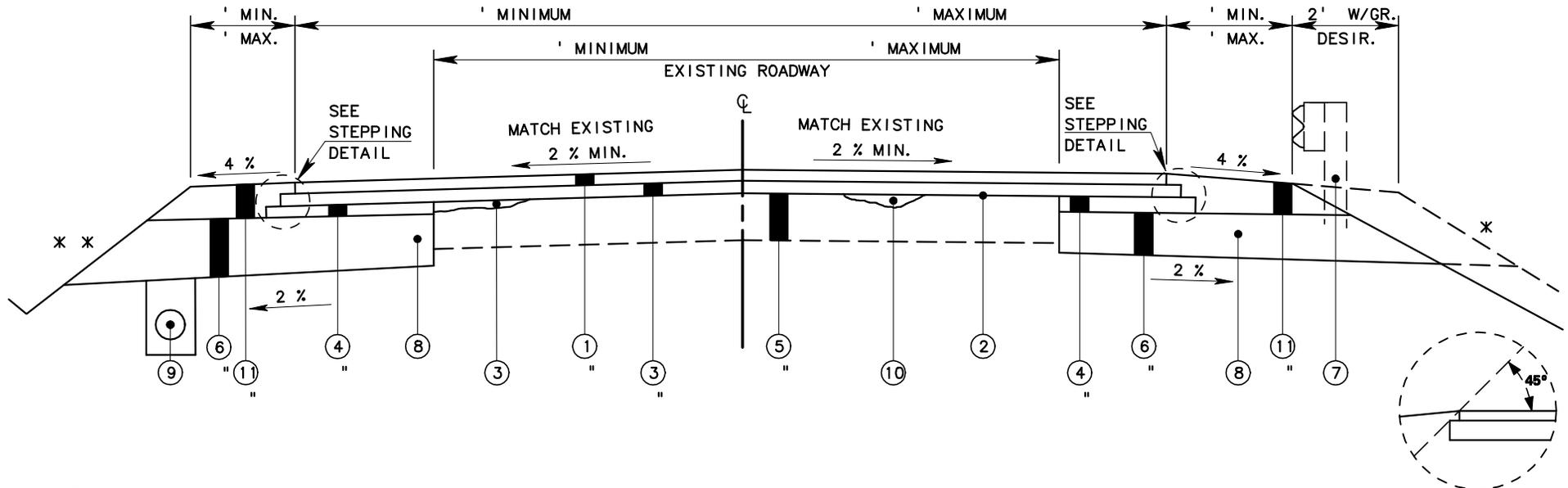
**NOTE:**  
The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

* EMBANKMENT SLOPE GUIDE	
HT. OF EMB.	SLOPE
0' TO 10'	4:1 DESIRABLE 2:1 MAX.
> 10'	2:1 DESIRABLE 1 1/2:1 MAX.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**NEW CONSTRUCTION**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT , STONE OR GRAVEL, TYPE OR  
ITEM 40 -002, HOT-MIX ASPHALT , SLAG, TYPE
- ② ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- ③ ITEM 401003-001, HOT-MIX ASPHALT PATCHING AND LEVELING COURSE, STONE OR GRAVEL OR  
ITEM 401003-002, HOT-MIX ASPHALT PATCHING AND LEVELING COURSE, SLAG
- ④ ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ⑤ EXISTING PAVEMENT
- ⑥ ITEM 307001-00 , AGGREGATE BASE COURSE, CLASS
- ⑦ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑧ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑨ ITEM 606025- , INCH UNDERDRAIN PIPE OR  
ITEM 606020-001 FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS
- ⑩ POT-HOLE REPAIR - (SEE POT-HOLE REPAIR DETAIL)
- ⑪ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR  
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10

**\* EMBANKMENT SLOPE GUIDE**

HT. OF EMB.	SLOPE
0' TO 5'	6:1
5' TO 10'	4:1
> 10'	2:1
1 1/2:1 MAX. W/ROCK FILL	

Note : Amount of widening on each side may vary throughout the project because of physical restrictions. Dimensions for right and left will vary as shown in the plans or as directed by the engineer.

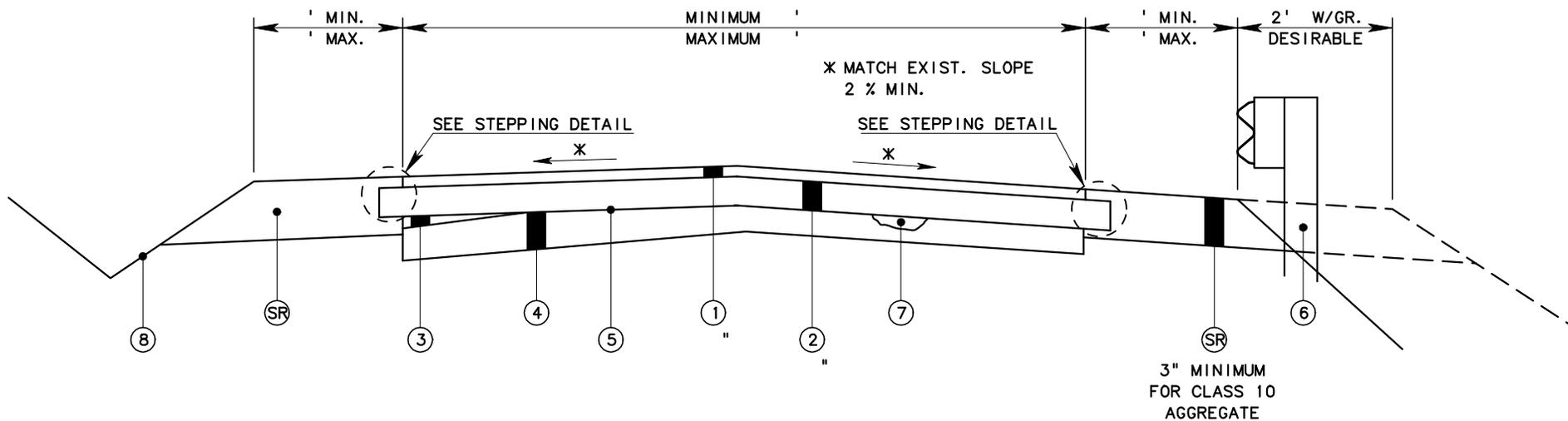
NOTE:  
The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

\* X AS NOTED OR AS PER CROSS-SECTION

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**ROAD WIDENING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT , STONE OR GRAVEL, TYPE OR  
ITEM 40 -002, HOT-MIX ASPHALT , SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 401003-001, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL OR  
ITEM 401003-002, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, SLAG
- ④ EXISTING ROADWAY
- ⑤ ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑥ ITEM 607001-001, TYPE I GUARDRAIL, CLASS PER L.F.
- ⑦ POT-HOLE REPAIR (SEE POT-HOLE DETAIL)
- ⑧ ITEM 229001-000 SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)



**SHOULDER WIDTHS:**

Reconstruct shoulders to the full width of existing shoulders up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

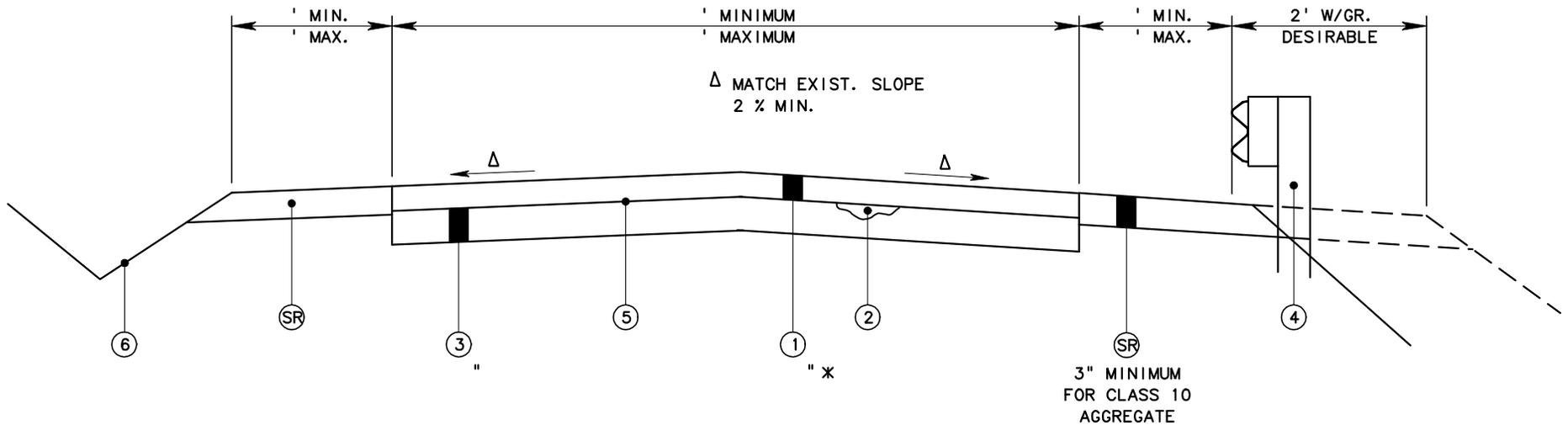
**NOTE:**

The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**RESURFACING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 401 -001, HOT-MIX ASPHALT COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401 -002, HOT-MIX ASPHALT COURSE, SLAG, TYPE
- ② POT-HOLE REPAIR (SEE POT-HOLE REPAIR DETAIL)
- ③ EXISTING ROADWAY
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- ⑥ ITEM 229001-000 SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

\* The intent of this dimension is to provide a quantity of HMA for leveling the existing road and simultaneously provide a smooth riding surface.

**SHOULDER WIDTHS:**

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

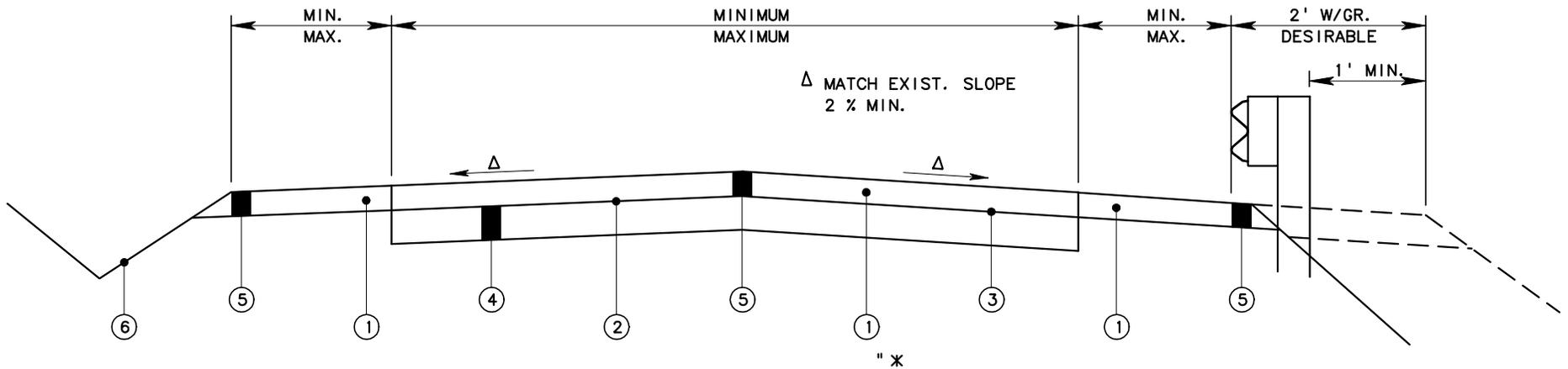
**NOTE:**

The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**RESURFACING - ONE COURSE**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT , STONE OR GRAVEL, TYPE
- ITEM 40 -002, HOT-MIX ASPHALT ,SLAG
- ② ITEM 401007-001, HOT-MIX ASPHALT, SCRATCH
- ITEM 401007-002, HOT-MIX ASPHALT, SLAG
- ③ ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- ④ EXISTING ROADWAY
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑤ ITEM 415005-001, REMOVE EXISTING PAVEMENT SURFACE
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

\* The intent of this dimension is to provide a quantity of HMA for leveling the existing road and simultaneously provide a smooth riding surface.

**SHOULDER WIDTHS:**

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

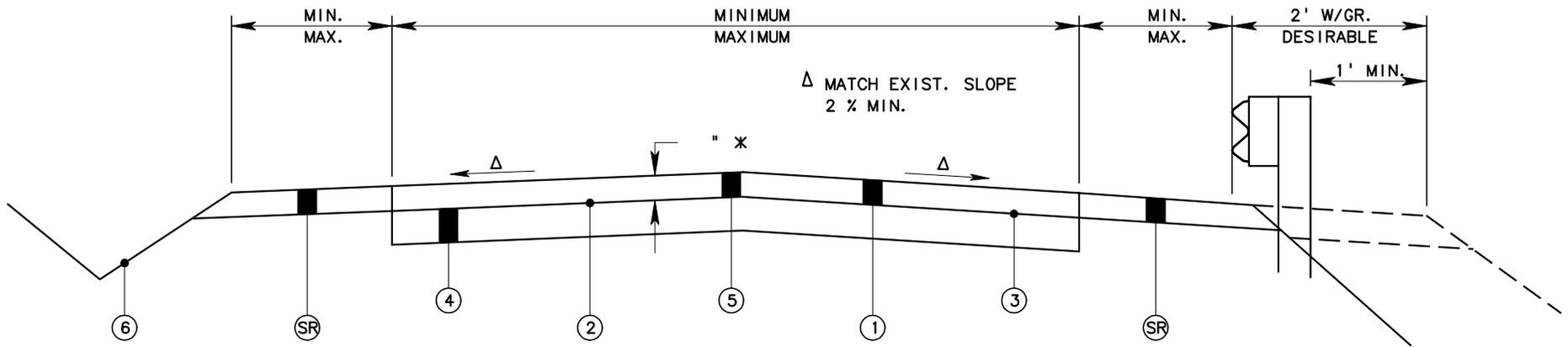
**NOTE:**

The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**MILLING & RESURFACING-W/ SCRATCH & WEARING-PAVED SHOULDERS**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT , STONE OR GRAVEL, TYPE
- ITEM 40 -002, HOT-MIX ASPHALT , SLAG
- ② ITEM 401007-001, HOT-MIX ASPHALT, SCRATCH
- ITEM 401007-002, HOT-MIX ASPHALT, SLAG
- ③ ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- ④ EXISTING ROADWAY
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑤ ITEM 415005-001, REMOVE EXISTING PAVEMENT SURFACE
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)

\* The intent of this dimension is to provide a quantity of HMA for leveling the existing road and simultaneously provide a smooth riding surface.

**SHOULDER WIDTHS:**

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

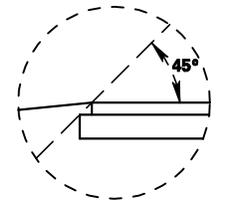
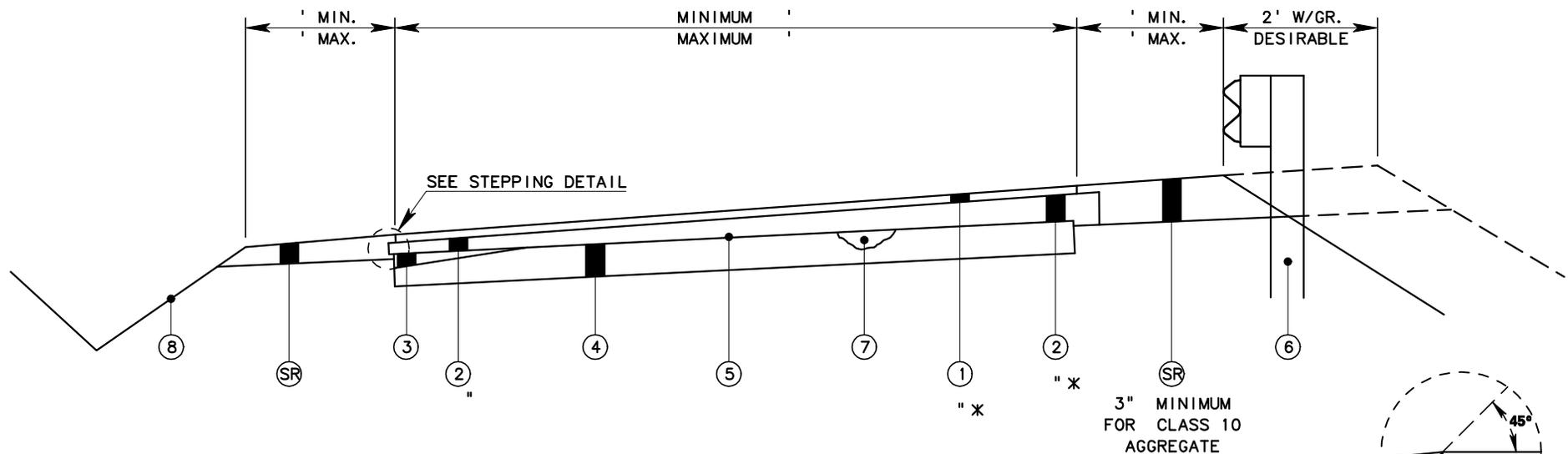
**NOTE:**

The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**MILLING AND RESURFACING - W/ SCRATCH AND WEARING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT, STONE OR GRAVEL, TYPE OR
- ITEM 40 -002, HOT-MIX ASPHALT, SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR
- ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 401003-001, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL, OR
- ITEM 401003-002, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, SLAG, TYPE
- ④ EXISTING ROADWAY
- ⑤ ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S.Y.
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)
- ⑥ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑦ POT-HOLE REPAIR (SEE POT-HOLE REPAIR DETAIL)
- ⑧ ITEM 229001-000 SHOULDERS AND DITCHES (SEE SHOULDER AND DITCHES DETAIL)

\* The intent of this dimension is to provide a quantity of HMA for leveling the existing road and simultaneously provide a smooth riding surface.

**SHOULDER WIDTHS:**

Reconstruct shoulders to the full width of existing shoulder up to the maximum as shown above.

Note : Refer to Heel-in Detail(s).

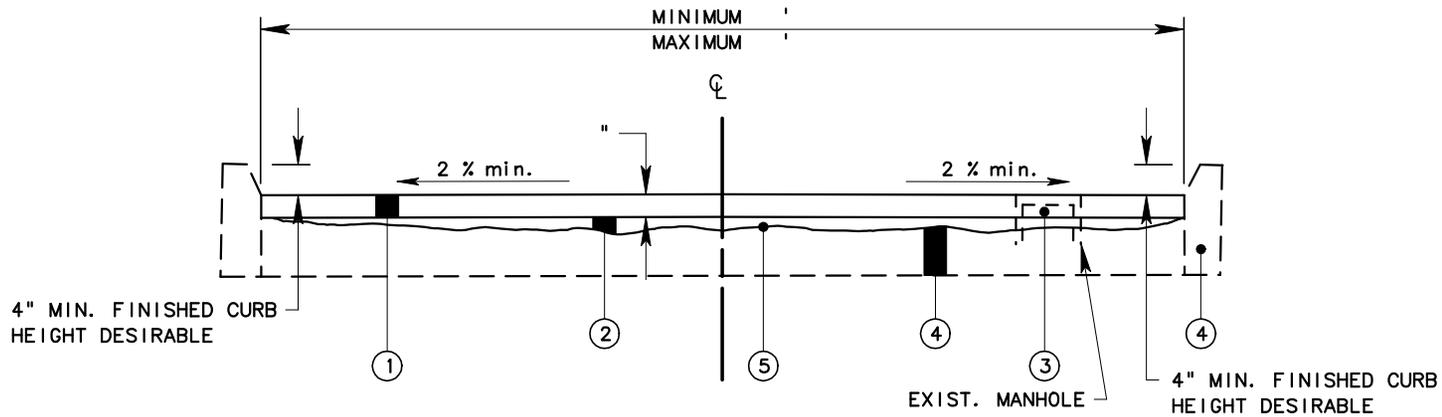
**NOTE:**

The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**SUPERELEVATION RESURFACING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

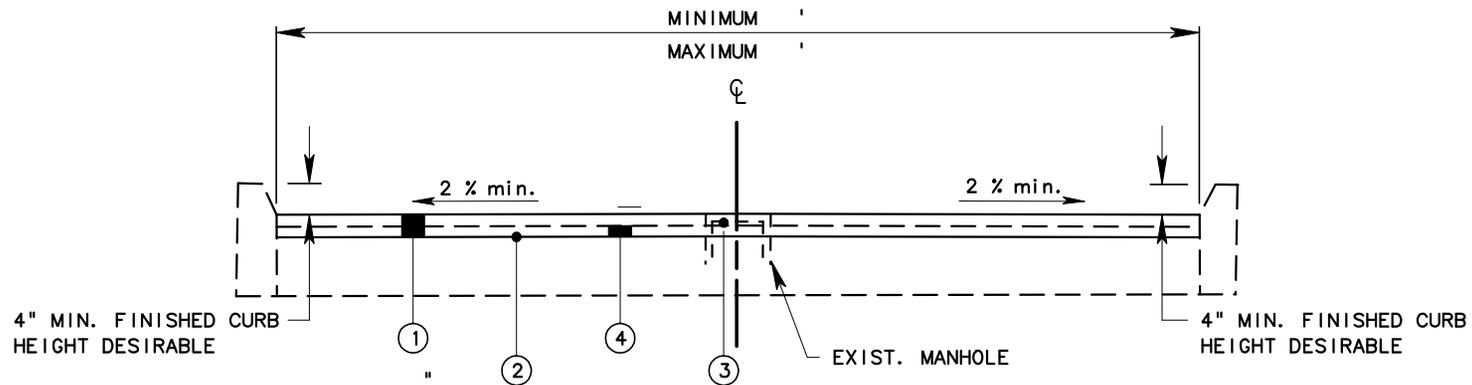
- ① ITEM 40 -001, HOT-MIX ASPHALT , STONE OR GRAVEL, TYPE OR  
ITEM 40 -002, HOT-MIX ASPHALT , SLAG, TYPE
- ② ITEM 401003-001, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL, OR  
ITEM 401003-002, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, SLAG
- ③ ITEM 605015-001, ADJUST MANHOLE TYPE
- ④ EXISTING PAVEMENT AND CURBS
- ⑤ ITEM 408002-001, BITUMINOUS MATERIAL, 0,03 GAL. PER S.Y.

**NOTE:**  
The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**CURBED STREET SECTION - FIRST RESURFACING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 40 -001, HOT-MIX ASPHALT, STONE OR GRAVEL, TYPE OR
- ITEM 40 -002, HOT-MIX ASPHALT, SLAG, TYPE
- ② ITEM 408002-001, BITUMINOUS MATERIAL, GAL. PER S.Y.
- ③ ITEM 605015-001, ADJUST MANHOLE TYPE
- ④ ITEM 415005-001, REMOVING EXISTING PAVEMENT SURFACE

**NOTE:**  
 The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

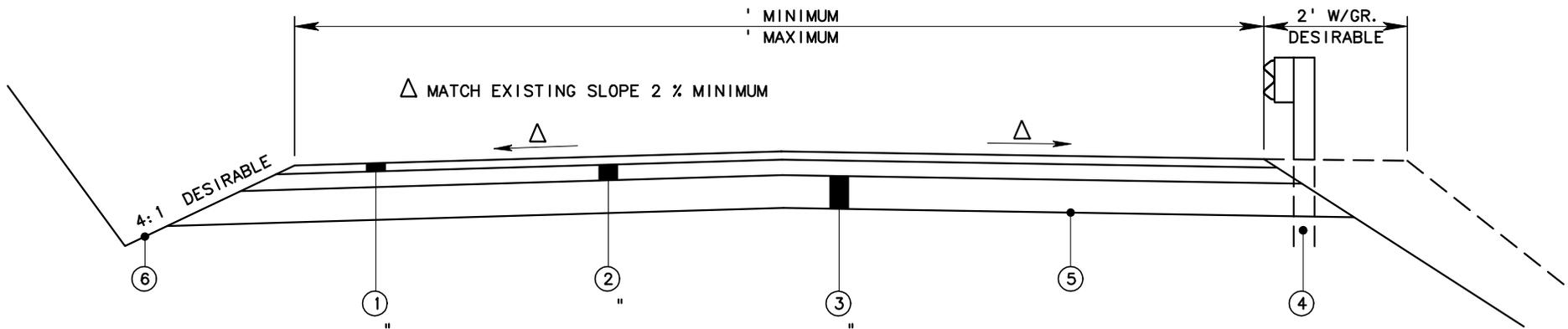
**NOTES :**

- ④ REMOVAL OF EXISTING BITUMINOUS PAVEMENT IS INTENDED TO ACHIEVE A 4" FINISHED CURB HEIGHT. REMOVAL IS TO BE OF VARIABLE THICKNESS TO ACHIEVE A SMOOTH - RIDING SURFACE.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**CURBED SECTION - SECOND AND SUBSEQUENT RESURFACING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 401002-001, HOT-MIX ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401002-002, HOT-MIX ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 307001-00 , AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 228001-000, SUBGRADE PREPARATION
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE DETAIL Page 28)

**NOTE :**

WHERE DITCH IS NOT OF SUFFICIENT DEPTH TO INSURE POSITIVE DRAINAGE FROM BASE COURSE, CURB SECTION AND OR UNDERDRAIN IS TO BE USED AS SHOWN IN NON-DITCH DETAILS. (No. 28 AND No. 29)

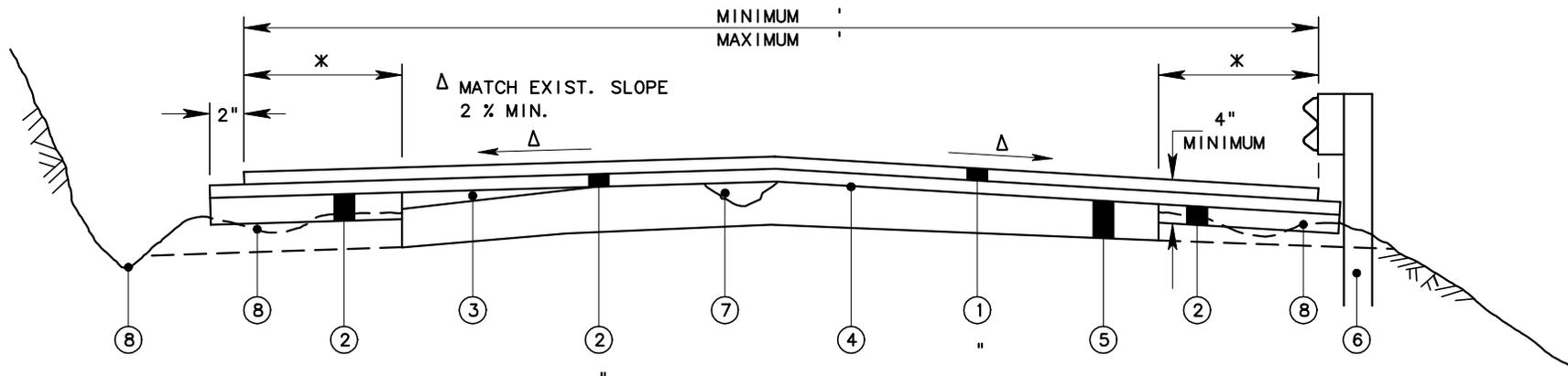
**NOTE:**

The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**NARROW ROAD PAVING - FULL WIDTH INCLUDING SHOULDERS**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 401002-001, HOT-MIX ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401002-002, HOT-MIX ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 401003-001, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, STONE OR GRAVEL OR  
ITEM 401003-002, HOT-MIX ASPHALT PATCH AND LEVEL COURSE, SLAG, TYPE
- ④ ITEM 408002-001, BITUMINOUS MATERIAL, GAL. PER S.Y.
- ⑤ EXISTING PAVEMENT
- ⑥ ITEM 607001-001, TYPE I GUARDRAIL, CLASS PER L.F.
- ⑦ POT-HOLE REPAIR - (SEE DETAIL Page 15)
- ⑧ ITEM 229001-000, SHOULDERS AND DITCHES (SEE DETAIL Page 28)

**NOTES:**

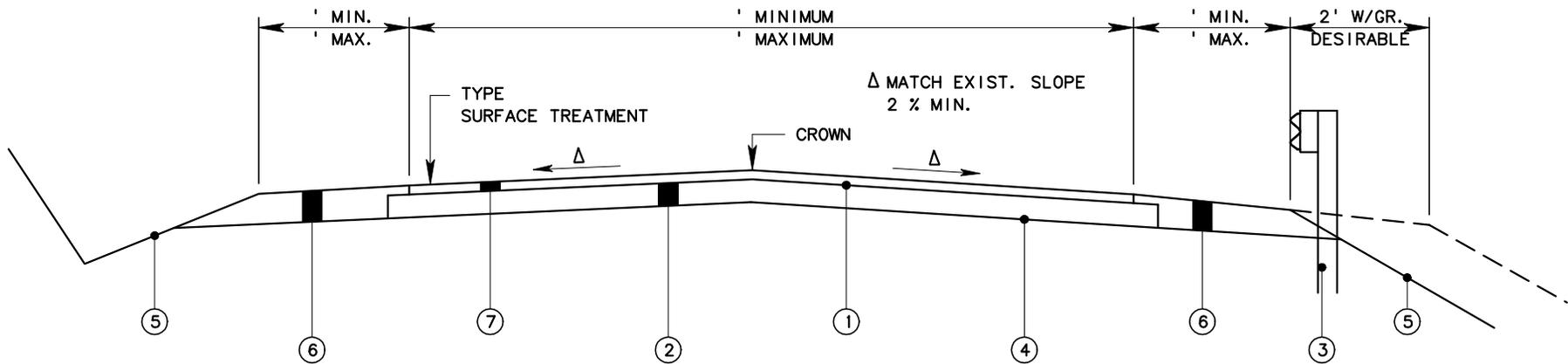
The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

\* WIDTH OF EXISTING SHOULDERS GENERALLY LESS THAN 2 FEET RESULTING IN COMPACTION DIFFICULTIES IF STONE IS SPECIFIED.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**RESURFACING ROADWAY WITH NARROW SHOULDERS**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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**NOTES:**

CROWN TANGENT SECTIONS WHEN PAVEMENT IS WIDE ENOUGH FOR 2-LANE TRAFFIC (16' MINIMUM).

ONE-LANE PAVEMENT TO BE SLOPED AT 2% TOWARD FILL SIDE WHERE PRACTICAL. CURVES TO BE REVERSE-SLOPED OR SUPER-ELEVATED AS NECESSARY.

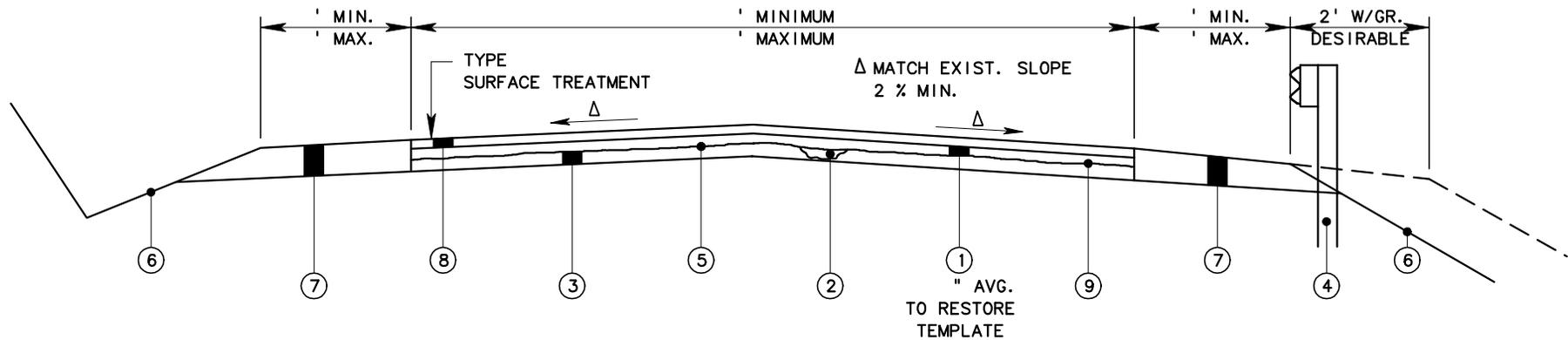
\* WHERE SHOULDERS ARE GENERALLY LESS THAN 2' WIDE, SHOULDER WIDTH WILL BE SHOWN AS 0 ABOVE INDICATING THAT SUCH SHOULDERS ARE TO BE PAVED WITH SAME MATERIAL AS TRAVELLED LANES.

- ① ITEM 408002-001, BITUMINOUS MATERIAL, GAL. PER S.Y.
- ② ITEM 307001-00, AGGREGATE BASE COURSE, CLASS
- ③ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ④ ITEM 228001-000, SUBGRADE PREPARATION
- ⑤ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- \* ⑥ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR  
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10
- ⑦ ITEM 405001-001, SURFACE TREATMENT AGGREGATE, STONE OR GRAVEL, TYPE OR  
ITEM 405001-002, SURFACE TREATMENT AGGREGATE, SLAG, TYPE  
ITEM 405003-001, BITUMINOUS MATERIAL

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## SURFACE TREATMENT ON STONE BASE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



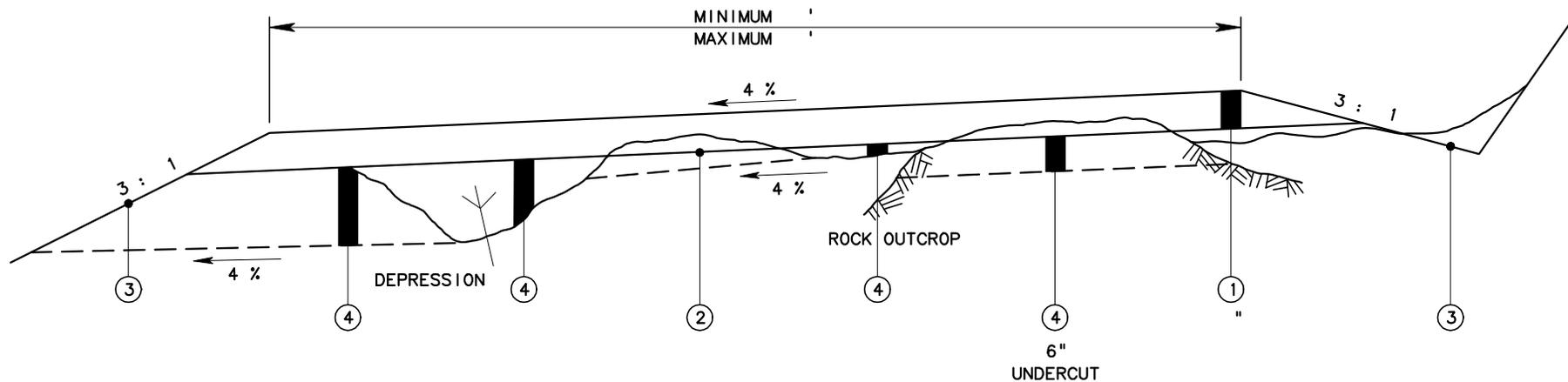
- ① ITEM 40 -001, HOT-LAID ASPHALT , STONE AND GRAVEL, CLASS OR  
ITEM 40 -002, HOT-LAID ASPHALT , SLAG, CLASS
- ② POT-HOLE REPAIR (SEE POT-HOLE REPAIR DETAIL)
- ③ EXISTING ROADWAY
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 408002-001, BITUMINOUS MATERIAL
- ⑥ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- \* ⑦ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR  
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10
- ⑧ ITEM 405001-001, SURFACE TREATMENT AGGREGATE, STONE OR GRAVEL OR  
ITEM 405001-002, SURFACE TREATMENT AGGREGATE, SLAG  
ITEM 405003-001, BITUMINOUS MATERIAL
- ⑨ ITEM 405002-001, PATCHING AND LEVELING AGGREGATE, STONE OR GRAVEL OR  
ITEM 405002-002, PATCHING AND LEVELING AGGREGATE, SLAG

**NOTE:**  
 \* WHERE SHOULDERS ARE GENERALLY LESS THAN 2' WIDE, SHOULDER WIDTH WILL BE SHOWN AS 0 ABOVE INDICATING THAT SUCH SHOULDERS ARE TO BE PAVED WITH SAME MATERIAL AS TRAVELLED LANES.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## SURFACE TREATMENT OVER BITUMINOUS SURFACE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 307001-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS OR  
ITEM 307001-002, AGGREGATE BASE COURSE, SLAG, CLASS
- ② ITEM 207002-000, SUBGRADE PREPARATION (PAID FOR UNDER SECTION 308)
- ③ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- ④ ITEM 307001-00 , AGGREGATE BASE COURSE, CLASS DEPRESSIONS

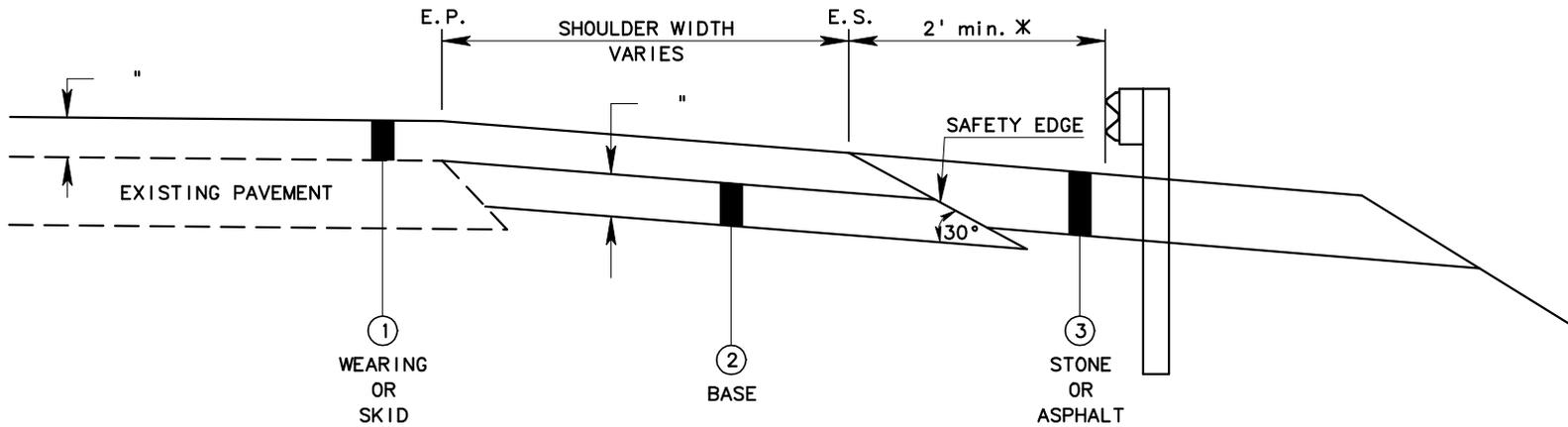
NOTE : SUBGRADE PREPARATION SHALL INCLUDE

- A. DEPRESSION REPAIR-NECESSARY GRADING TO POSITIVELY DRAIN AREA TO BE FILLED WITH STONE.
- B. ROCK OUTCROP UNDERCUT-NECESSARY RIPPING AND/OR BLASTING.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**STONE STABILIZED ROADWAY**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM -001, , TYPE
- ② ITEM -001, , TYPE
- ③ ITEM -001, , TYPE

**NOTES:**

\* 2' minimum on interstates and expressways. On rural roads where shoulders are to be paved use 6"

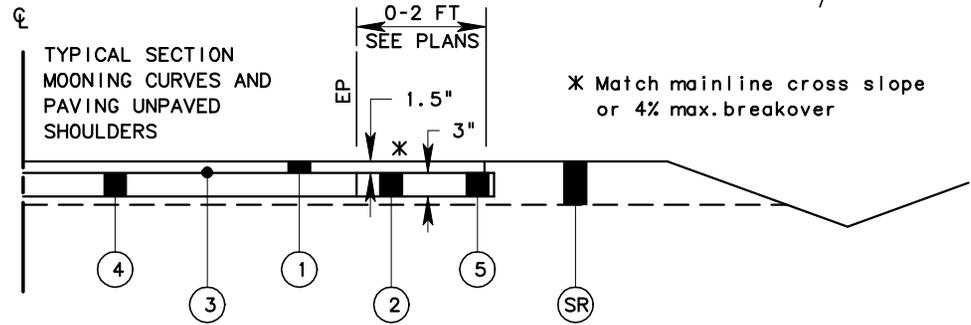
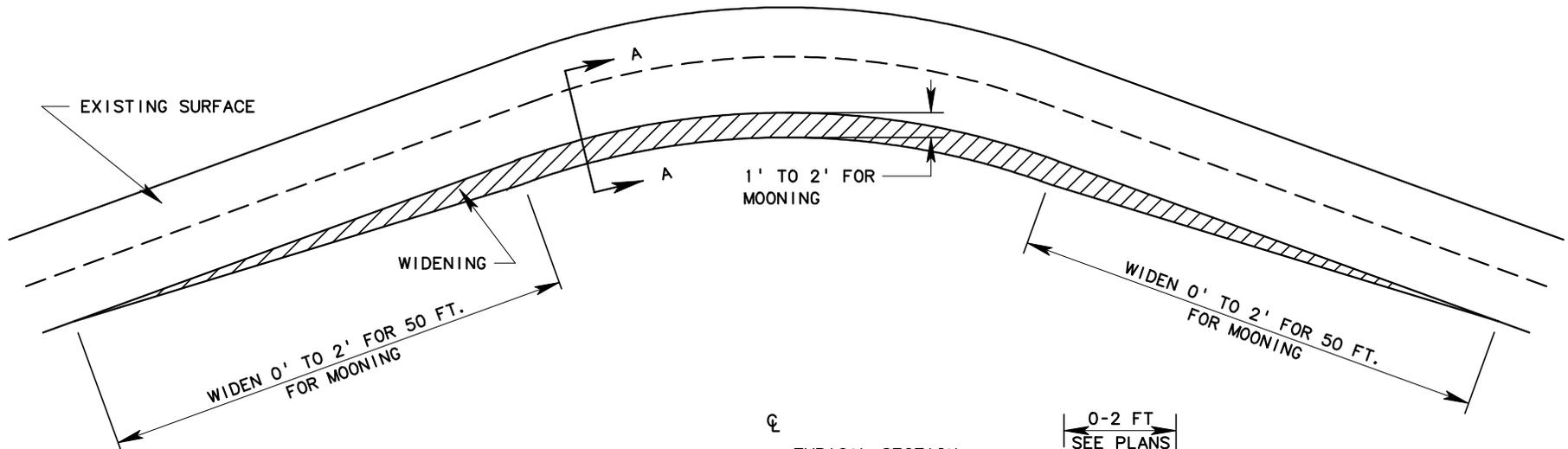
A Special Provision is required when using this detail.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**SHOULDER PAVING DETAIL WITH SAFETY EDGE**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

TYPICAL  
WIDENING / MOONING  
OF A CURVE



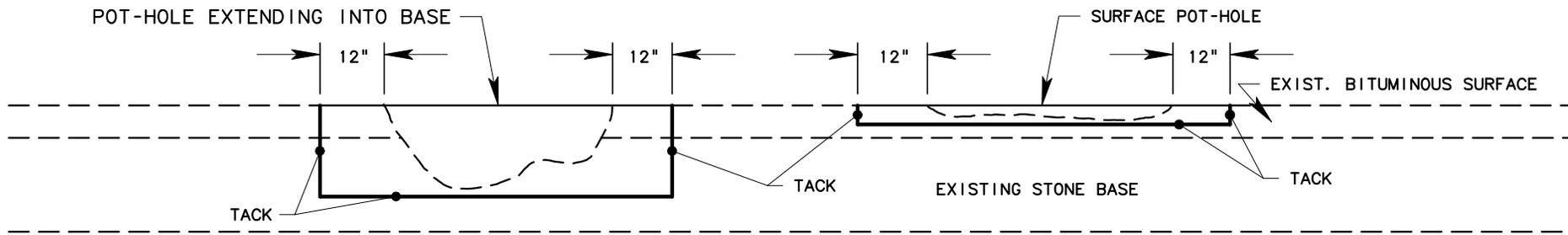
SECTION A-A

- ① ITEM 401002-001, MARSHALL HMA WEARING COURSE, ST OR GR, TYPE 1  
ITEM 401002-002, MARSHALL HMA WEARING COURSE, SLAG, TYPE 1
- ② ITEM 401001-001, MARSHALL HMA BASE COURSE, ST OR GR, TYPE 2 OR  
ITEM 401001-002, MARSHALL HMA BASE COURSE, SLAG, TYPE 2
- ③ ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL PER SY
- ④ EXISTING ROADWAY
- ⑤ UNCLASSIFIED EXCAVATION
- SR SHOULDER RECONSTRUCTION (SEE SHOULDER RECONSTRUCTION DETAIL)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MOONING CURVES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



(ELEVATION VIEW)

THE SIDES AND BOTTOMS MUST BE CLEANED AFTER THE HOLE IS SHAPED TO FROM A SQUARE OR RECTANGLE WHOSE SIDES ARE PARALLEL OR AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC WITH THE EDGES NEAT AND AS NEARLY VERTICAL AS POSSIBLE.

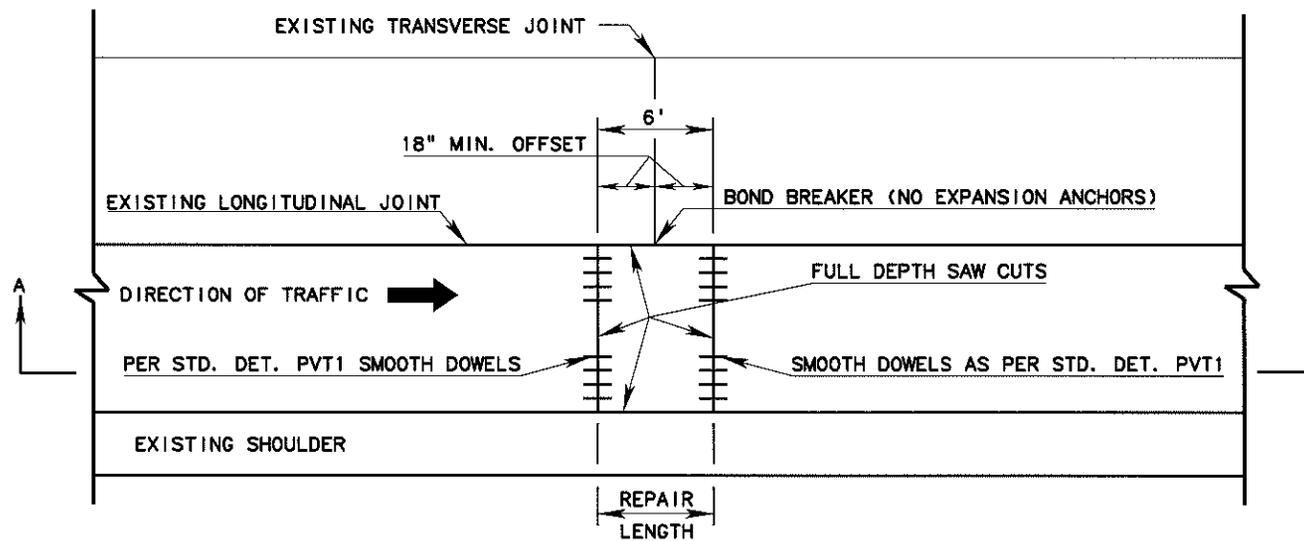
THE EXISTING BASE WILL BE REPLACED WITH HOT-LAID ASPHALT.

THE REMAINING SURFACE POT-HOLE WILL BE FILLED WITH HOT-LAID ASPHALT BASE COURSE TYPE MEETING REQUIREMENTS OF SECTION 401 OF THE SPECS. ENOUGH MATERIAL MUST BE USED TO BRING THE SURFACE OF REPAIR ABOUT 1/4" ABOVE THE LEVEL OF THE ORIGINAL PAVEMENT TO ALLOW FOR FURTHER COMPACTION BY TRAFFIC AND/OR RESURFACING.

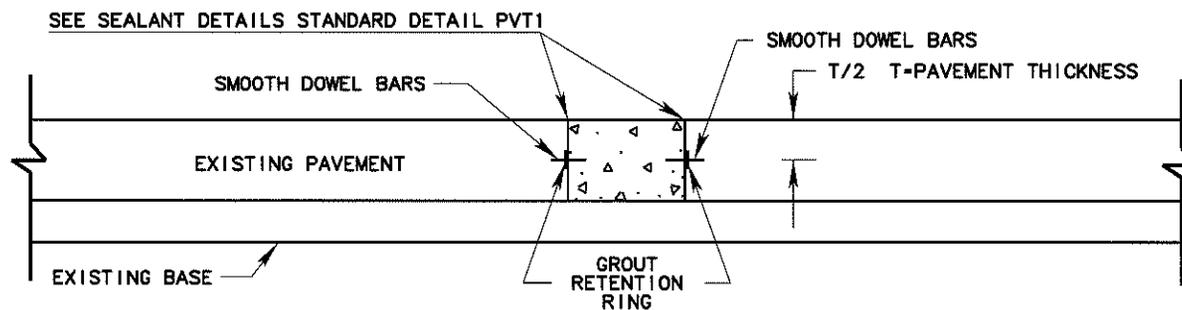
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## POT - HOLE REPAIR DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



PLAN



SECTION A-A

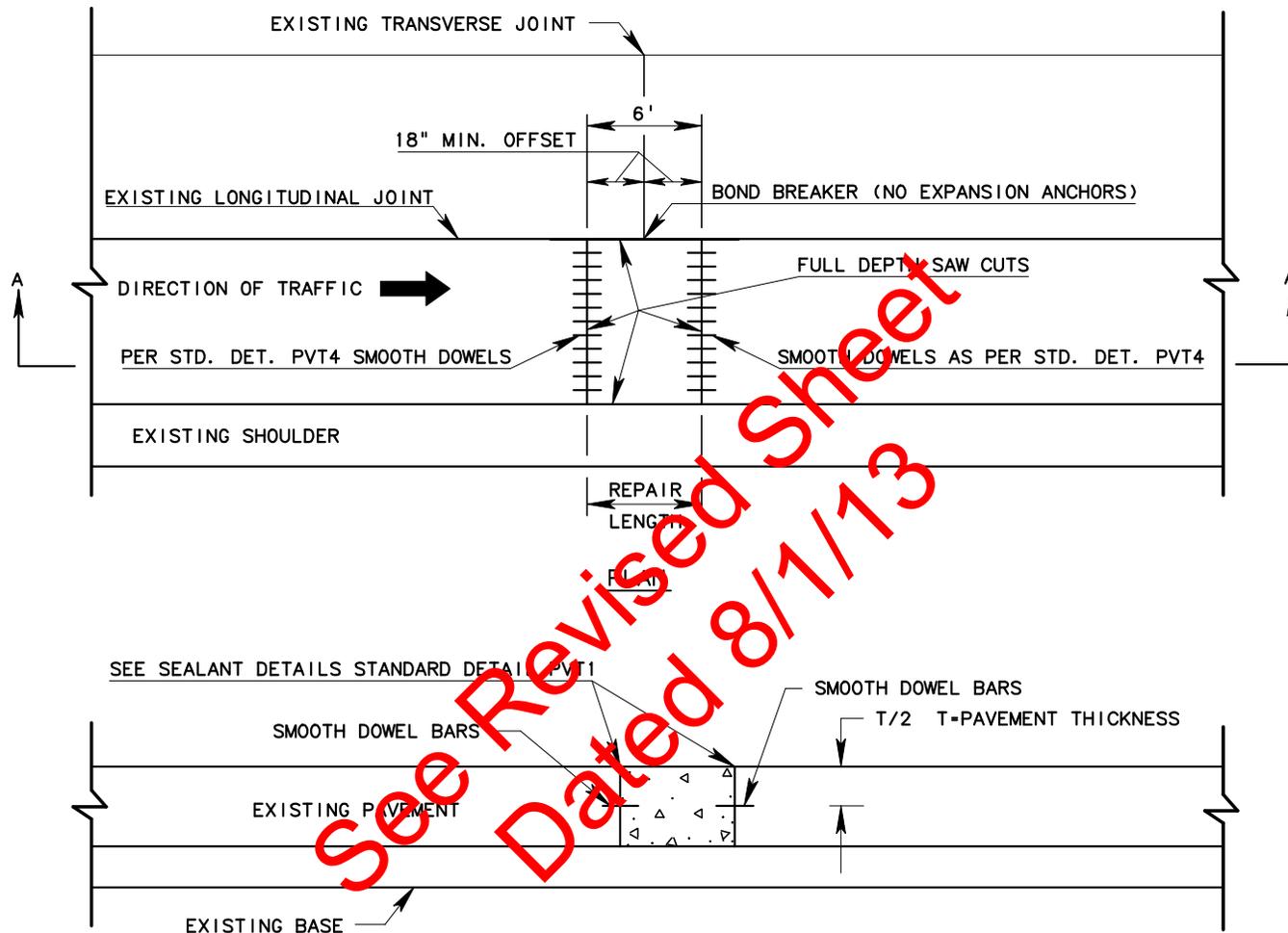
METHOD A

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT EVEN THOUGH ONLY ONE SIDE NEEDS REPAIR.  
THE TOTAL REPAIR LENGTH SHALL BE 6 FOOT.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# CONCRETE REPAIR DETAIL (METHOD A) 1 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



SECTION A-A

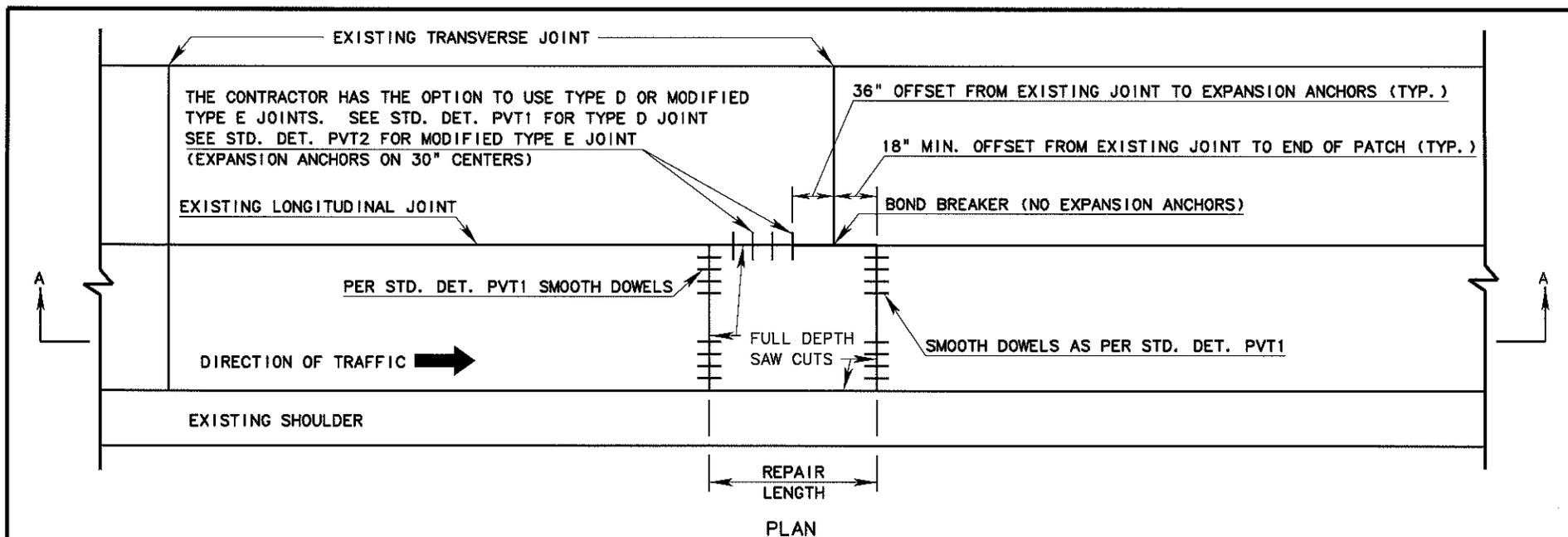
METHOD A

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT EVEN THOUGH ONLY ONE SIDE NEEDS REPAIR. THE TOTAL REPAIR LENGTH SHALL BE 6' CENTERED ON THE ADJACENT TRANSVERSE JOINT.

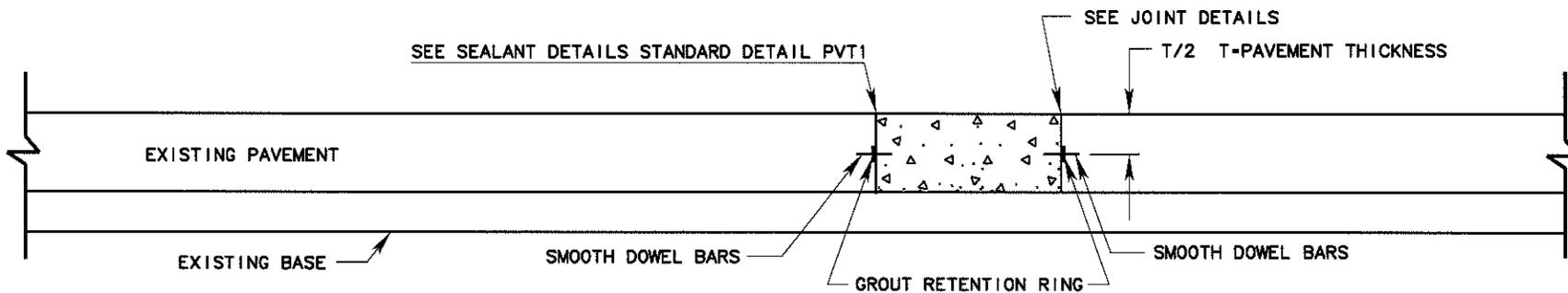
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD A) 1 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



PLAN



SECTION A-A

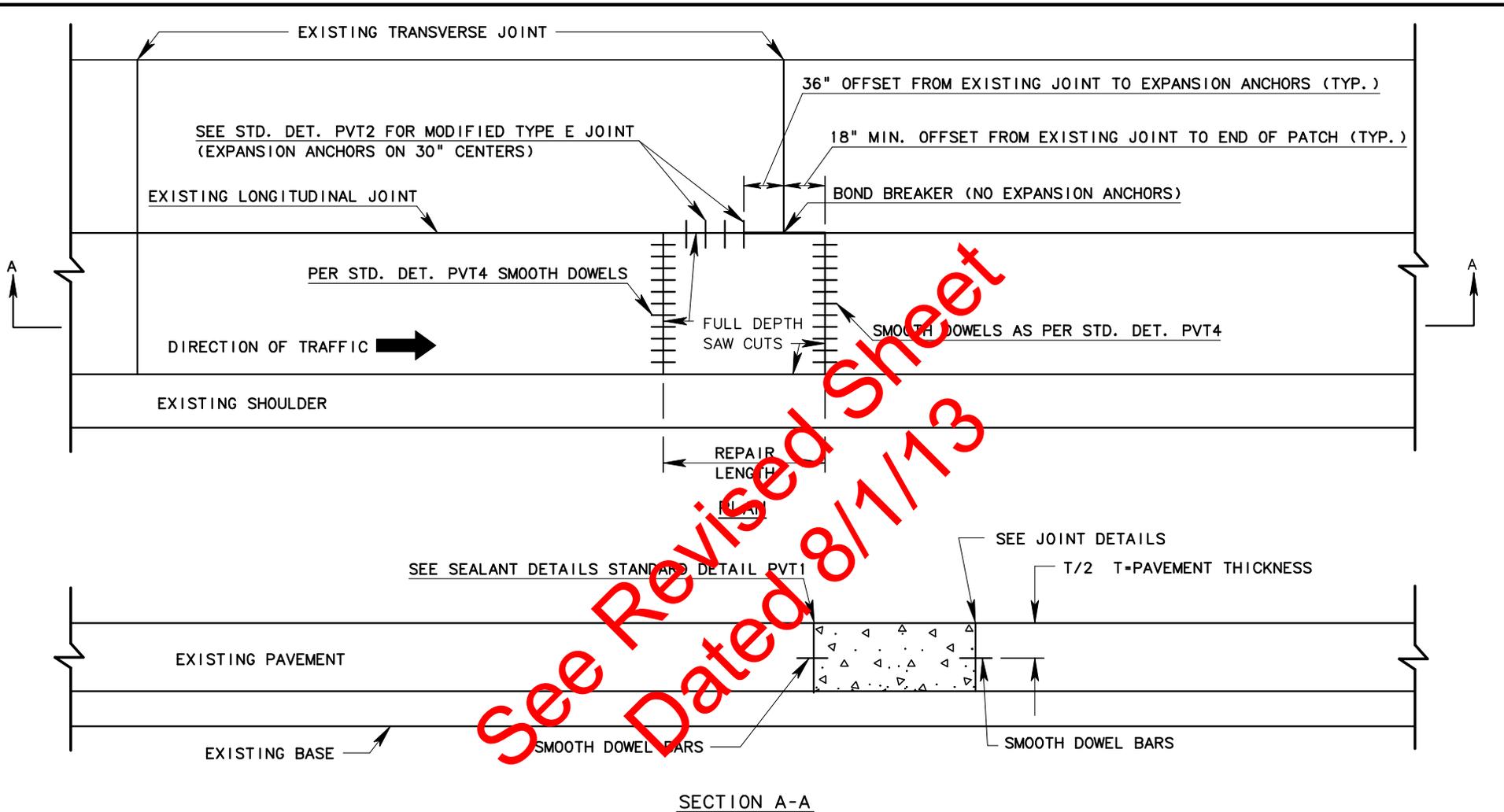
METHOD B

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT WHEN THE REPAIR EXCEEDS 36" ON ONLY ONE SIDE OF THE JOINT. (NOTE THAT THE 18" OFFSET IS TO ALLOW FOR THE REMOVAL AND REPLACEMENT OF DOWELS.) REPAIRS ARE GREATER THAN 6' BUT LESS THAN 15' IN LENGTH AND REQUIRE LONGITUDINAL TYPE D OR MODIFIED TYPE E JOINTS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD B) 2 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



SECTION A-A

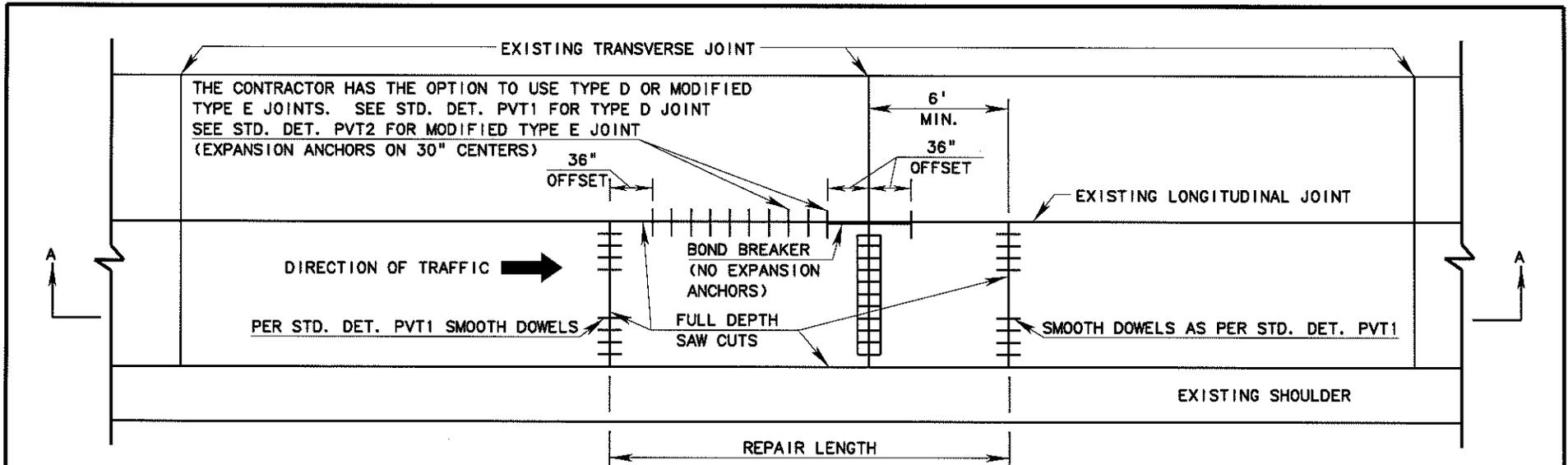
METHOD B

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT WHEN THE REPAIR EXCEEDS 36" ON ONLY ONE SIDE OF THE JOINT. (NOTE THAT THE 36" OFFSET IS TO ALLOW FOR THE REMOVAL AND REPLACEMENT OF DOWELS.) REPAIRS ARE GREATER THAN 6' BUT LESS THAN 15' IN LENGTH AND REQUIRE LONGITUDINAL MODIFIED TYPE E JOINTS.

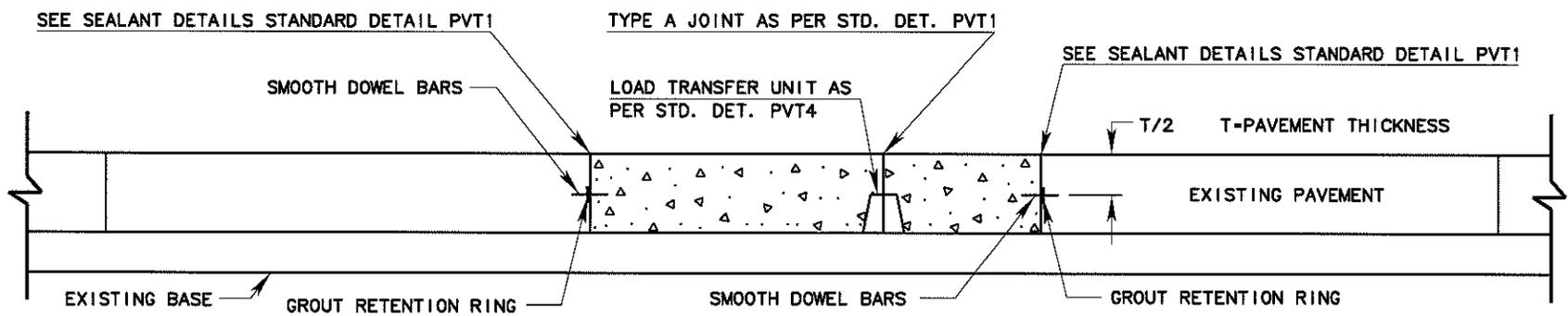
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD B) 2 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



PLAN

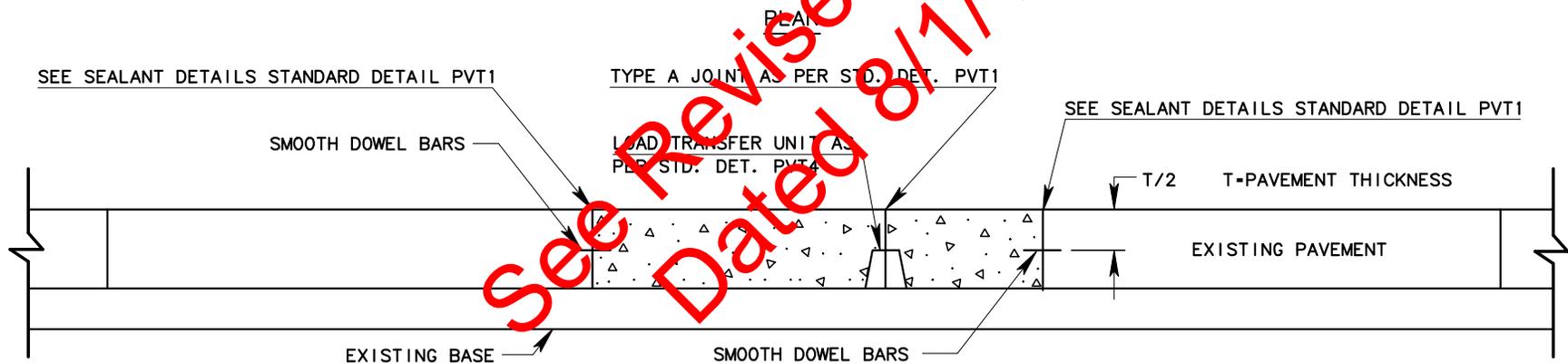
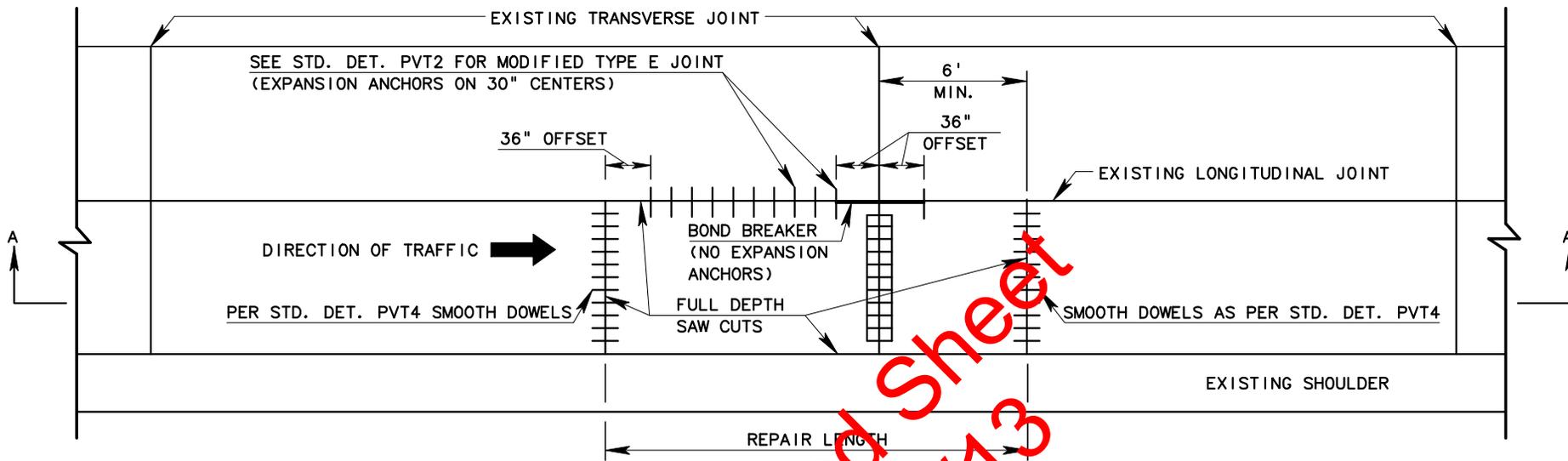


SECTION A-A

METHOD C

REPAIRS EXCEEDING 36" ON BOTH SIDES OF AN EXISTING TRANSVERSE JOINT, REPAIR SLABS AND REMAINS OF EXISTING SLABS SHALL NOT BE LESS THAN 15' IN LENGTH.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS				
<b>CONCRETE REPAIR DETAIL (METHOD C) 3 OF 6</b>				
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



SECTION A-A

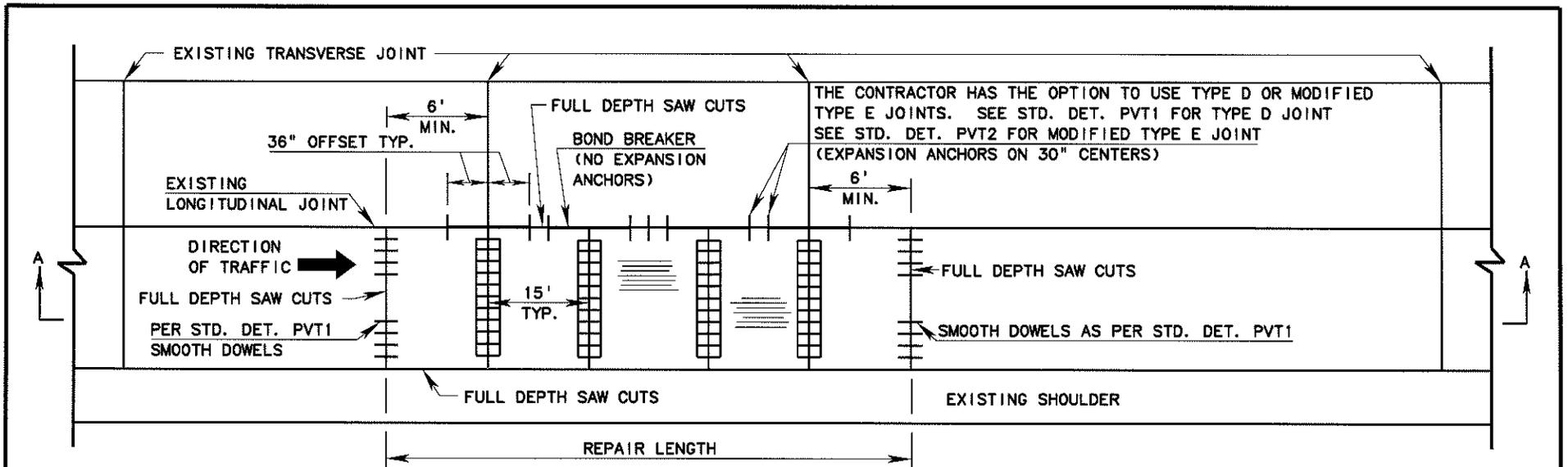
METHOD C

REPAIRS EXCEEDING 36" ON BOTH SIDES OF AN EXISTING TRANSVERSE JOINT, REPAIR SLABS AND REMAINS OF EXISTING SLABS SHALL NOT BE LESS THAN 15' IN LENGTH.

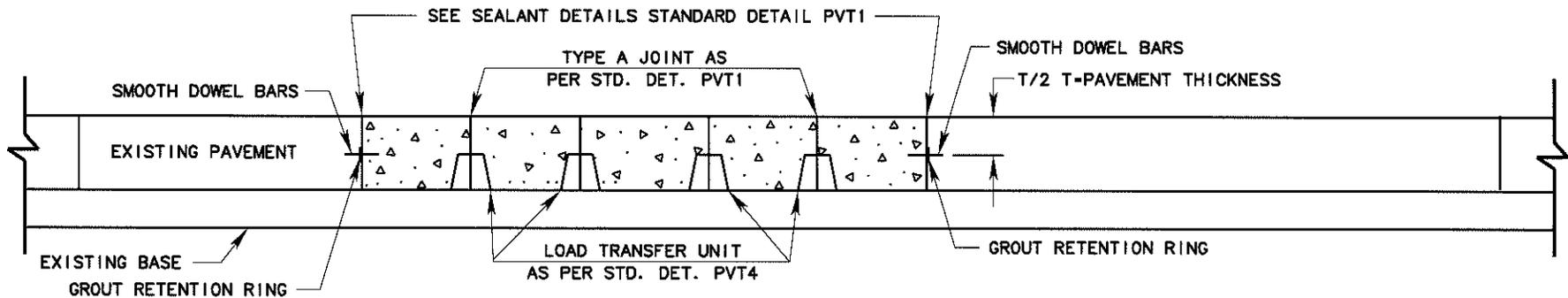
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD C) 3 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



PLAN



SECTION A-A

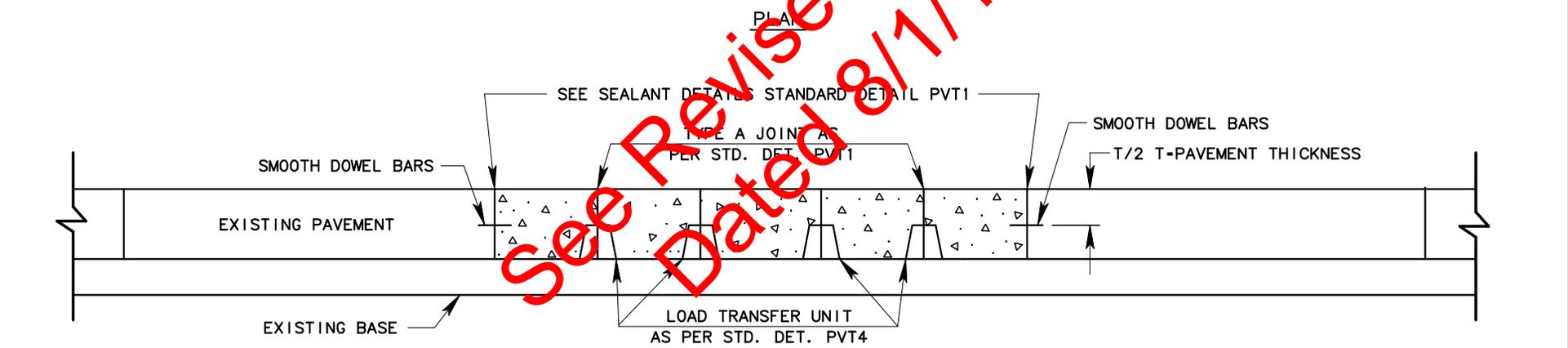
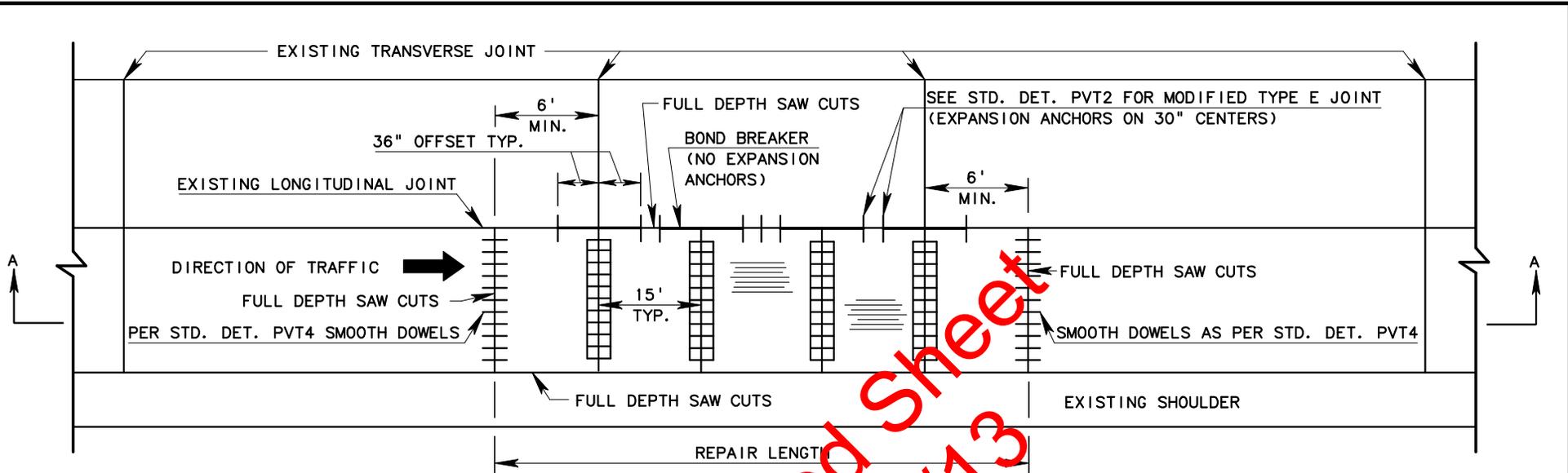
METHOD D

REPAIRS PERFORMED TO COMPLETELY REPLACE SLABS BETWEEN TWO JOINTS. EXISTING DOWELS AND ASSEMBLIES SHALL BE COMPLETELY REMOVED WHEN A REPAIR IS PERFORMED AT A TRANSVERSE JOINT.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD D) 4 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



SECTION A-A

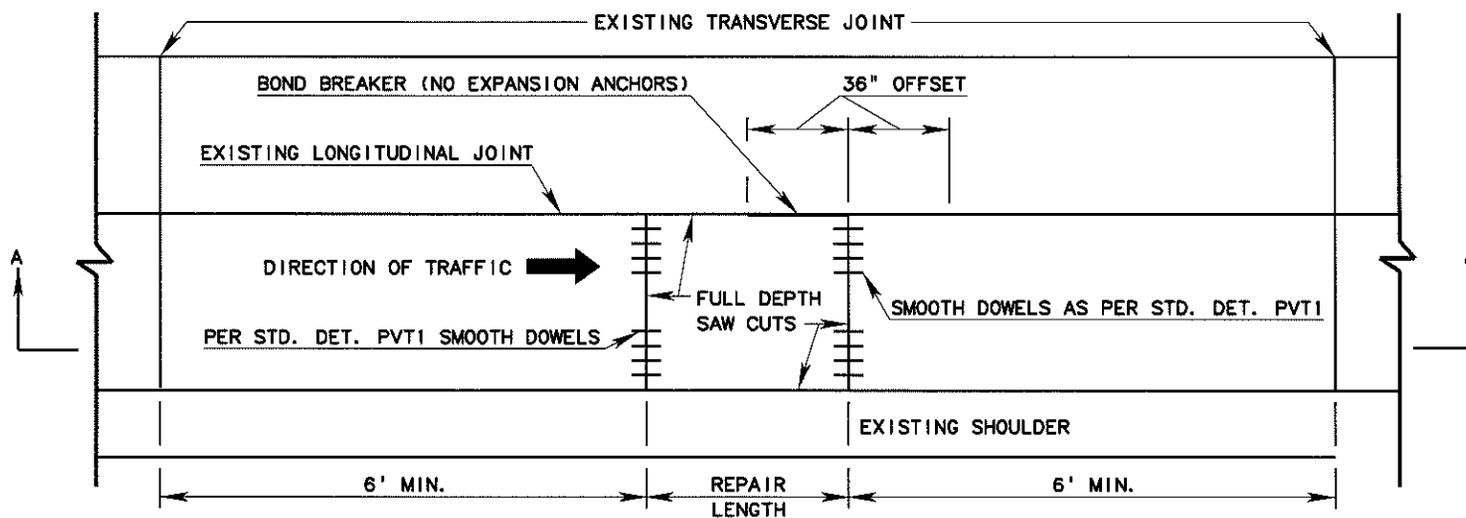
METHOD D

REPAIRS PERFORMED TO COMPLETELY REPLACE SLABS BETWEEN TWO JOINTS. EXISTING DOWELS AND ASSEMBLIES SHALL BE COMPLETELY REMOVED WHEN A REPAIR IS PERFORMED AT A TRANSVERSE JOINT.

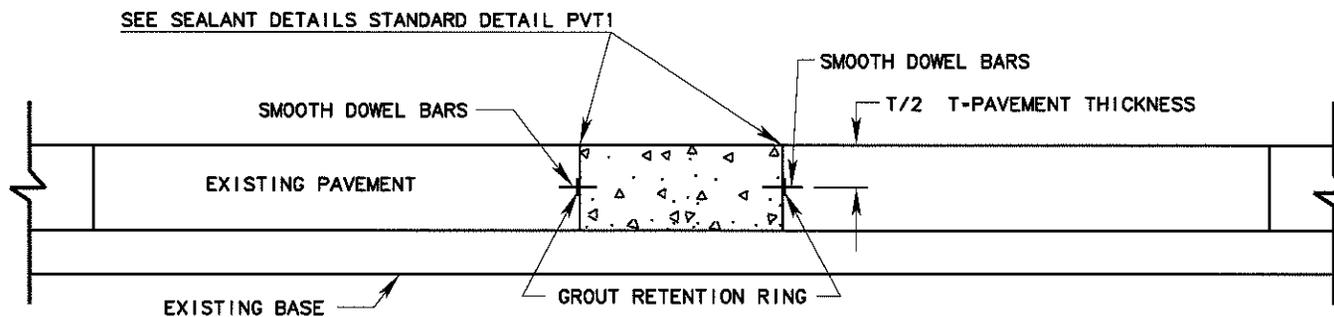
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD D) 4 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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PLAN



SECTION A-A

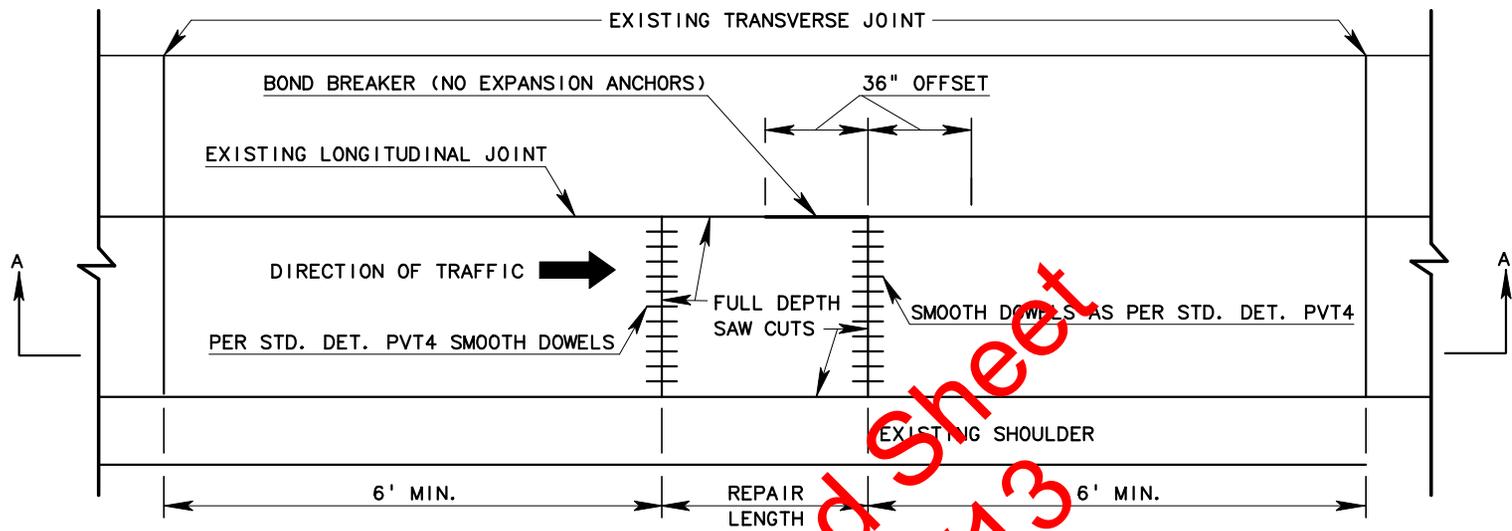
METHOD E

REPAIRS PERFORMED AT MID SLAB SHALL BE A MINIMUM OF 6' FROM AN EXISTING TRANSVERSE JOINT. DETAIL METHODS A, B, C AND D SHALL APPLY.

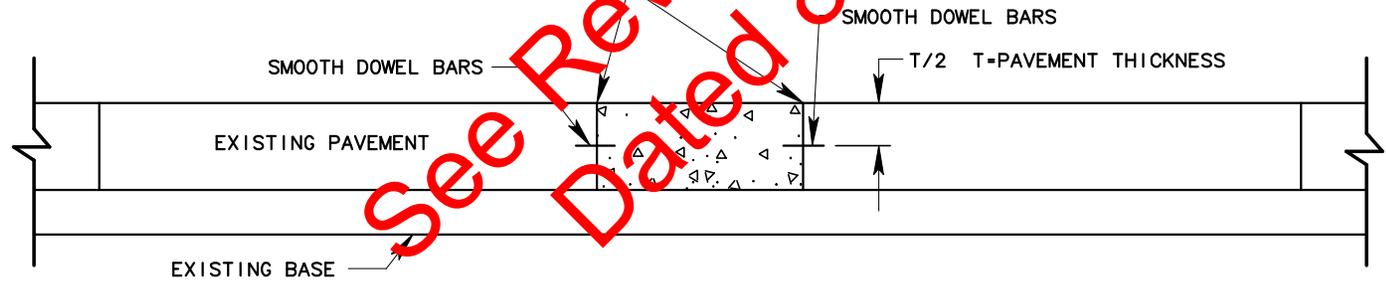
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD E) 5 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



SEE SEALANT DETAILS STANDARD DETAIL PVT1



SECTION A-A

METHOD E

REPAIRS PERFORMED AT MID SLAB OR A MINIMUM OF 6' FROM AN EXISTING TRANSVERSE JOINT. ALL REPAIRS OFFSET MORE THAN 36" ON BOTH SIDES OF AN EXISTING JOINT SHALL BE EXTENDED TO A MINIMUM OF 6' AND DOWEL ASSEMBLIES SHALL BE PLACED ADJACENT TO THE EXISTING TRANSVERSE JOINTS AS SHOWN IN REPAIR METHOD 'C'.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE REPAIR DETAIL (METHOD E) 5 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

GENERAL NOTES

REPAIRS SHALL BE MADE USING CONCRETE MEETING THE REQUIRMENTS OF SECTION 501 OF THE SPECIFICATIONS, SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH SUBSECTION 228 OF THE SPECIFICATIONS AND MAY REQUIRE ADDITIONAL MATERIAL TO FACILITATE PLACEMENT OF LOAD TRANSFER UNITS. COST TO BE INCLUDED IN VARIOUS ITEMS IN THE CONTRACT. HOLES FOR THE DOWELS AND LOAD TRANSFER UNITS SHALL BE DRILLED SIMULTANEOUSLY TO THE REQUIRED DEPTH USING FRAME MOUNTED DRILLS WHICH WILL MAINTAIN THE DRILLS IN A LONGITUDINALLY PARRALLEL POSITION. HOLE DIAMETER SHALL BE 1/8" LARGER FOR CEMENT GROUTS AND 1/16" FOR EPOXIES THAN THE BAR DIAMETER. AN EPOXY BONDING COMPOUND AS APPROVED BY THE WVDOT MATERIALS CONTROL, SOIL AND TESTING DIVISION SHALL BE USED TO SECURE THE DOWEL/TIE BARS IN PLACE. JOINTS SHALL BE MADE IN ACCORDANCE WITH SECTION 501 OF THE SPECIFICATIONS AND DETAILS ATTACHED IN PLANS. ALL DOWELS SHALL BE EPOXY COATED. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED FOR REMOVING AND REPLACING EXISTING PORTLAND CEMENT CONCRETE PAVEMENT IN ACCORDANCE WITH THE ABOVE DETAILS. COST SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 506001-001 CONCRETE PAVEMENT REPAIR. THE CONTRACTOR IS REQUIRED TO SCHEDULE WORK ON ALL CONCRETE PAVEMENT REPAIRS IN SUCH A MANNER THAT WILL NOT PERMIT OPEN HOLES TO REMAIN OPEN OVERNIGHT OR ON WEEKENDS.

OVERSAWING INTO ADJACENT SLABS WHEN ONLY ONE LANE OR PORTION OF A LANE IS TO BE REMOVED SHALL BE KEPT TO THE MINIMUM NECESSARY TO ENSURE THAT FULL DEPTH CUTS IN THE CORNERS HAVE BEEN ACHIEVED. ALL OVERSAWING SHALL BE THOROUGHLY CLEANED AND REPAIRED WITH AN EPOXY BONDING COMPOUND AS APPROVED BY THE WVDOT MATERIALS CONTROL, SOILS AND TESTING DIVISION.

MINIMUM 1 1/4" DIAMETER PLAIN EPOXY COATED DOWEL BARS, AS PER STANDARD DETAIL SHEET PVT4, WILL BE USED AT BOTH ENDS OF THE REPAIR. STARTING 6-12 INCHES FROM EITHER EDGE AND THEN ON 12" CENTERS.

TYPE D OR MODIFIED TYPE E JOINTS AS PER STANDARD DETAIL SHEETS PVT4 AND PVT2 MAY BE USED FOR THE LONGITUDINAL CONSTRUCTION JOINT. BARS SHALL BE SPACED ON 30" CENTERS WITH THE EXCEPTION THAT BARS WILL NOT BE PLACED WITHIN 36" OF A WORKING CONSTRUCTION JOINT OR AN ADJACENT TRANSVERSE CONTRACTION JOINT, OR AN ADJACENT WORKING CRACK THAT WILL NOT BE REPAIRED. A BOND BREAKER WILL BE PLACED IN THIS AREA IN LIEU OF THE EXPANSION ANCHORS.

FOR PAVEMENT REPAIR LENGTHS GREATER THAN 15', LOAD TRANSFER UNITS AS PER STANDARD DETAIL SHEET PVT4 SHALL BE INSTALLED:

1. TO MATCH ADJACENT CONTRACTION JOINTS OR RANDOM TRANSVERSE CRACKS IF ONLY ONE LANE IS REPLACED, OR
2. ON 15" CENTERS IF MORE THAN ONE LANE OF PAVEMENT REPAIR IS BEING REPLACED.

CONTRACTION JOINTS IN THE ADJACENT LANE SCHEDULED TO REMAIN SHALL BE SEALED ON THEIR LOGITUDINAL FACE PRIOR TO PLACEMENT OF CONCRETE IN THE REPAIR AREA IN ORDER TO PREVENT NEW CONCRETE FROM ENTERING.

HOT POUR JOINT SEALANT MEETING ASTM SPECIFICATION D3405 MAY BE SUBSTITUTED FOR THE LOW-MODULUS SILICONE SEALANT SPECIFIED ON STANDARD DETAIL SHEET PVT1.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**CONCRETE REPAIR DETAIL (NOTES) 6 OF 6**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

GENERAL NOTES

REPAIRS SHALL BE MADE USING CONCRETE MEETING THE REQUIRMENTS OF SECTION 501 OF THE SPECIFICATIONS, SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH SUBSECTION 228 OF THE SPECIFICATIONS AND MAY REQUIRE ADDITIONAL MATERIAL TO FACILITATE PLACEMENT OF LOAD TRANSFER UNITS. COST TO BE INCLUDED IN VARIOUS ITEMS IN THE CONTRACT. HOLES FOR THE DOWELS AND LOAD TRANSFER UNITS SHALL BE DRILLED SIMULTANEOUSLY TO THE REQUIRED DEPTH USING FRAME MOUNTED DRILLS WHICH WILL MAINTAIN THE DRILLS IN A LONGITUDINALLY PARRALLEL POSITION. HOLE DIAMETER SHALL BE ¼" LARGER FOR CEMENT GROUTS AND ⅙" FOR EPOXIES THAN THE BAR DIAMETER. AN EPOXY BONDING COMPOUND AS APPROVED BY THE WVDOT MATERIALS CONTROL, SOIL AND TESTING DIVISION SHALL BE USED TO SECURE THE DOWEL/TIE BARS IN PLACE. JOINTS SHALL BE MADE IN ACCORDANCE WITH SECTION 501 OF THE SPECIFICATIONS AND DETAILS ATTACHED IN PLANS. ALL DOWELS SHALL BE EPOXY COATED. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED FOR REMOVING AND REPLACING EXISTING PORTLAND CEMENT CONCRETE PAVEMENT IN ACCORDANCE WITH THE ABOVE DETAILS. COST SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 506001-001 CONCRETE PAVEMENT REPAIR. THE CONTRACTOR IS REQUIRED TO SCHEDULE WORK ON ALL CONCRETE PAVEMENT REPAIRS IN SUCH A MANNER THAT WILL NOT PERMIT OPEN HOLES TO REMAIN OPEN OVERNIGHT OR ON WEEKENDS.

OVERSAWING INTO ADJACENT SLABS WHEN ONLY ONE LANE OR PORTION OF A LANE IS TO BE REMOVED SHALL BE KEPT TO THE MINIMUM NECESSARY TO ENSURE THAT FULL DEPTH CUTS IN THE CORNERS HAVE BEEN ACHIEVED. ALL OVERSAWING SHALL BE THOROUGHLY CLEANED AND REPAIRED WITH AN EPOXY BONDING COMPOUND AS APPROVED BY THE WVDOT MATERIALS CONTROL, SOILS AND TESTING DIVISION.

MINIMUM 1¼" DIAMETER PLAIN EPOXY COATED DOWEL BARS, AS PER STANDARD DETAIL SHEET PVT4, WILL BE USED AT BOTH ENDS OF THE REPAIR. SPACING SHALL BE ON 12" CENTERS.

TYPE E OR MODIFIED TYPE E JOINTS AS PER STANDARD DETAIL SHEETS PVT1 AND PVT2 MAY BE USED FOR THE LONGITUDINAL CONSTRUCTION JOINT. BARS SHALL BE SPACED ON 30" CENTERS WITH THE EXCEPTION THAT BARS WILL NOT BE PLACED WITHIN 36" OF A WORKING CONSTRUCTION JOINT OR AN ADJACENT TRANSVERSE CONTRACTION JOINT, OR AN ADJACENT WORKING CRACK THAT WILL NOT BE REPAIRED. A BOND BREAKER WILL BE PLACED IN THIS AREA IN LIEU OF THE EXPANSION ANCHORS.

FOR PAVEMENT REPAIR LENGTHS GREATER THAN 15', LOAD TRANSFER UNITS AS PER STANDARD DETAIL SHEET PVT4 SHALL BE INSTALLED:

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2. ON 15" CENTERS IF MORE THAN ONE LANE OF PAVEMENT REPAIR IS BEING REPLACED.

CONTRACTION JOINTS IN THE ADJACENT LANE SCHEDULED TO REMAIN SHALL BE SEALED ON THEIR LOGITUDINAL FACE PRIOR TO PLACEMENT OF CONCRETE IN THE REPAIR AREA IN ORDER TO PREVENT NEW CONCRETE FROM ENTERING.

HOT POUR JOINT SEALANT MEETING ASTM SPECIFICATION D3405 MAY BE SUBSTITUTED FOR THE LOW-MODULUS SILICONE SEALANT SPECIFIED ON STANDARD DETAIL SHEET PVT1.

See Revised Sheet Dated 8/1/13

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

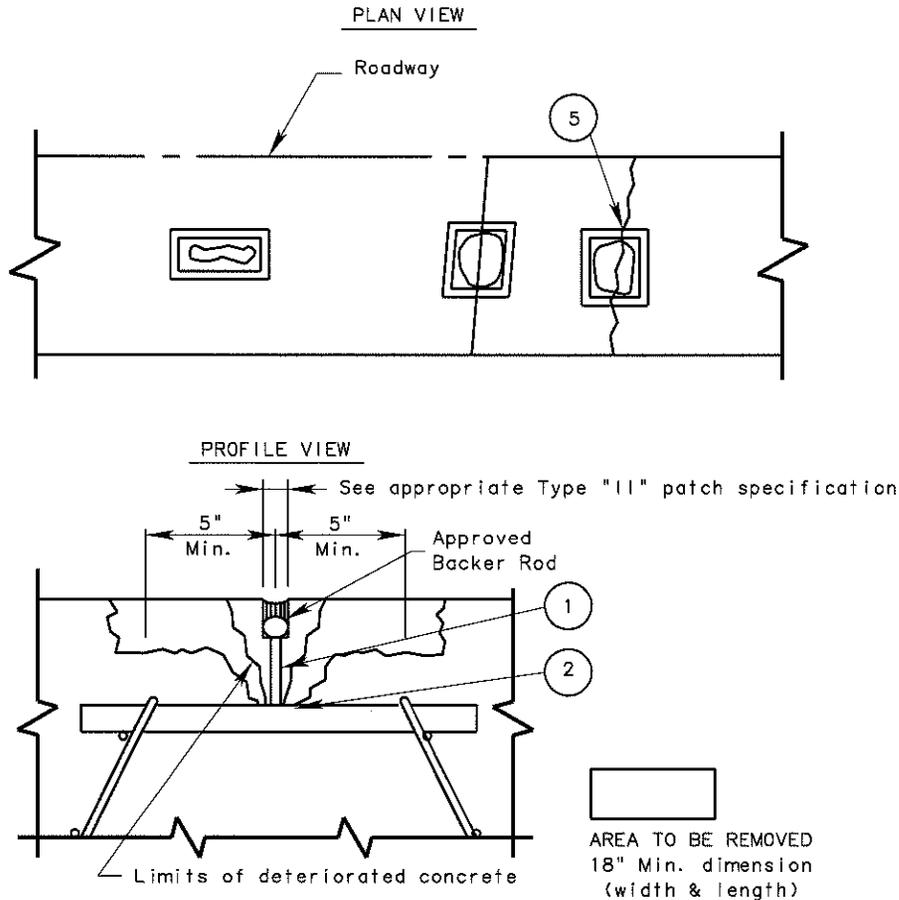
CONCRETE REPAIR DETAIL (NOTES) 6 OF 6

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

CONSTRUCTION NOTES:

DESCRIPTION: REMOVE CONCRETE, FURNISH AND PLACE CONCRETE, SAW, AND SEAL JOINTS/CRACKS.

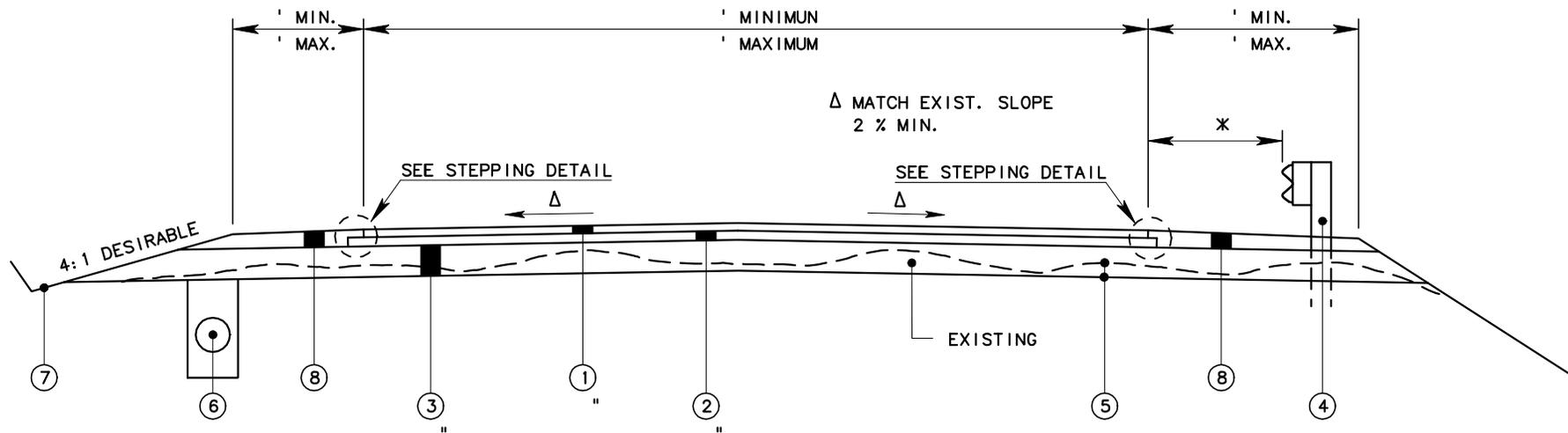
1. DO NOT PLACE CONCRETE FOR PARTIAL DEPTH REPAIRS AT AIR TEMPERATURES BELOW 40°F.
2. DO NOT USE "JACKHAMMERS" FOR PARTIAL DEPTH REPAIRS. REMOVAL HAMMERS ARE LIMITED TO A MAXIMUM RATED WEIGHT OF 35 LBS.
3. REMOVE THE CONCRETE SURFACE IN THE DESIGNATED REPAIR AREAS TO A MINIMUM DEPTH OF 2 INCHES AND ALL DETERIORATED CONCRETE REMOVE TO A MAXIMUM DEPTH OF ONE-HALF PAVEMENT THICKNESS.
4. REMOVE THE CONCRETE SURFACE IN THE DESIGNATED REPAIR AREA BY EITHER MILLING OR BY DELINEATING THE REPAIR AREA BY SAW CUTS. THE CONTRACTOR SHALL NOT DAMAGE THE DOWEL BARS DURING THE REMOVAL PROCESS. ANY DAMAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE CONTRACTOR SHALL PROVIDE A COMPRESSION RELIEF SAW CUT OR INSTALL COMPRESSION RELIEF MATERIAL AT THE TIME OF PLACEMENT OF THE CONCRETE TO RE-ESTABLISH JOINTS AND CRACKS AT THEIR ORIGINAL LOCATIONS. COMPRESSION RELIEF MATERIAL EQUAL TO EXISTING CRACK WIDTH, ¼" MINIMUM, 1" MAXIMUM. MATERIAL TO BE INSTALLED AT THE TIME OF CONCRETE PLACEMENT TO THE FULL DEPTH OF THE REPAIR. EDGING OF THE RESTORED CRACK IS REQUIRED.
6. THE CONTRACTOR WILL PROVIDE AND PLACE A EPOXY BONDING MATERIAL TO THE PREPARED CONCRETE REPAIR SURFACE.
7. THE CONTRACTOR SHALL FURNISH, PLACE, FINISH AND CURE CONCRETE IN ACCORDANCE WITH SECTION 501 OR CLASS B IN ACCORDANCE WITH SECTION 601. AND AS MODIFIED BY SECTION 506 AS REPLACEMENT CONCRETE FOR ALL PARTIAL DEPTH REPAIRS. AASHTO NUMBER 8 SHALL BE ALLOWED AS THE COURSE AGGREGATE FOR CONCRETE MIXES USED FOR PARTIAL DEPTH REPAIRS.
8. THE CONTRACTOR SHALL SAW AND SEAL EXISTING JOINTS AND CRACKS INVOLVING PARTIAL DEPTH REPAIRS.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## PARTIAL DEPTH REPAIR

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**LEGEND**

- ① ITEM 401002-001, HOT-MIX ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401002-001, HOT-MIX ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 30700 -000, AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑥ ITEM 606025- , INCH UNDERDRAIN PIPE OR  
ITEM 606020-001, FABRIC UNDERDRAIN (AS SHOWN IN PLANS)
- ⑦ ITEM 229001-000, SHOULDERS AND DITCHES (SEE SHOULDERS AND DITCHES DETAIL)
- ⑧ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR  
ITEM 307005-002, AGGREGATE BASE COURSE, SLAG, CLASS 10



STEPPING DETAIL

**NOTES:**

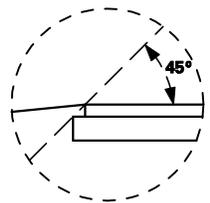
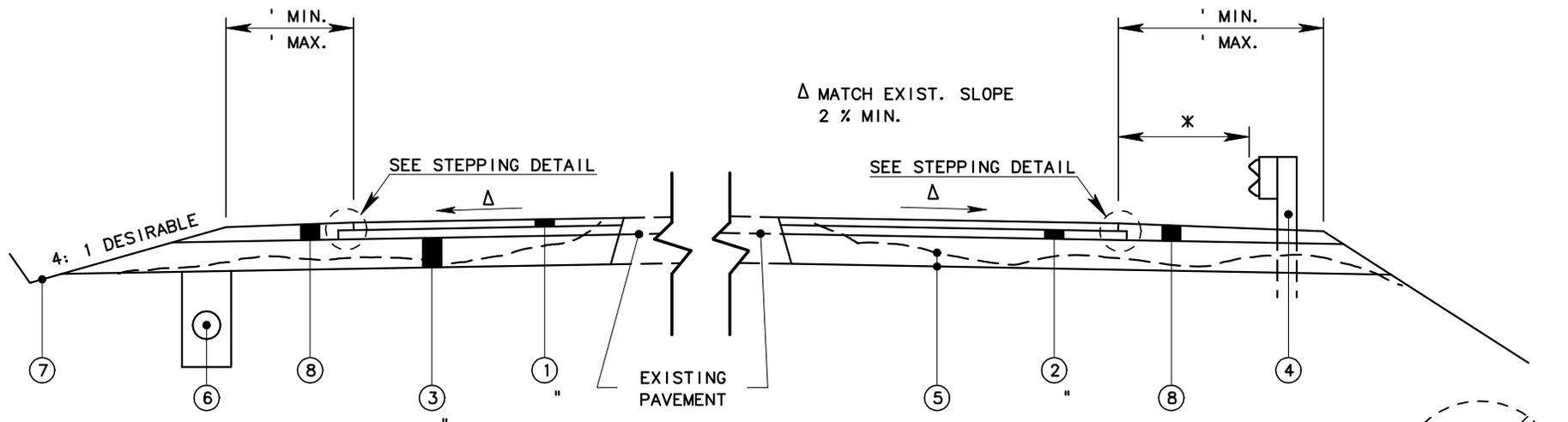
The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

\* GUARDRAIL TO BE LOCATED AT THE PREVAILING OFFSET IN ADJACENT SECTIONS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**TYPICAL SECTION FOR BASE FAILURE - FULL WIDTH**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



STEPPING DETAIL

**LEGEND**

- ① ITEM 401002-001, HOT-MIX ASPHALT WEARING COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401002-002, HOT-MIX ASPHALT WEARING COURSE, SLAG, TYPE
- ② ITEM 401001-001, HOT-MIX ASPHALT BASE COURSE, STONE OR GRAVEL, TYPE OR  
ITEM 401001-002, HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE
- ③ ITEM 30700 -000, AGGREGATE BASE COURSE, CLASS
- ④ ITEM 607001-001, TYPE I GUARDRAIL, CLASS
- ⑤ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑥ ITEM 606025- , INCH UNDERDRAIN PIPE OR  
ITEM 606020-001, FABRIC UNDERDRAIN (AS SHOWN IN PLANS)
- ⑦ ITEM 229001-001, SHOULDERS AND DITCHES (SEE DETAIL Page 28)
- ⑧ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10 OR  
ITEM 307005-001, AGGREGATE BASE COURSE, SLAG, CLASS 10

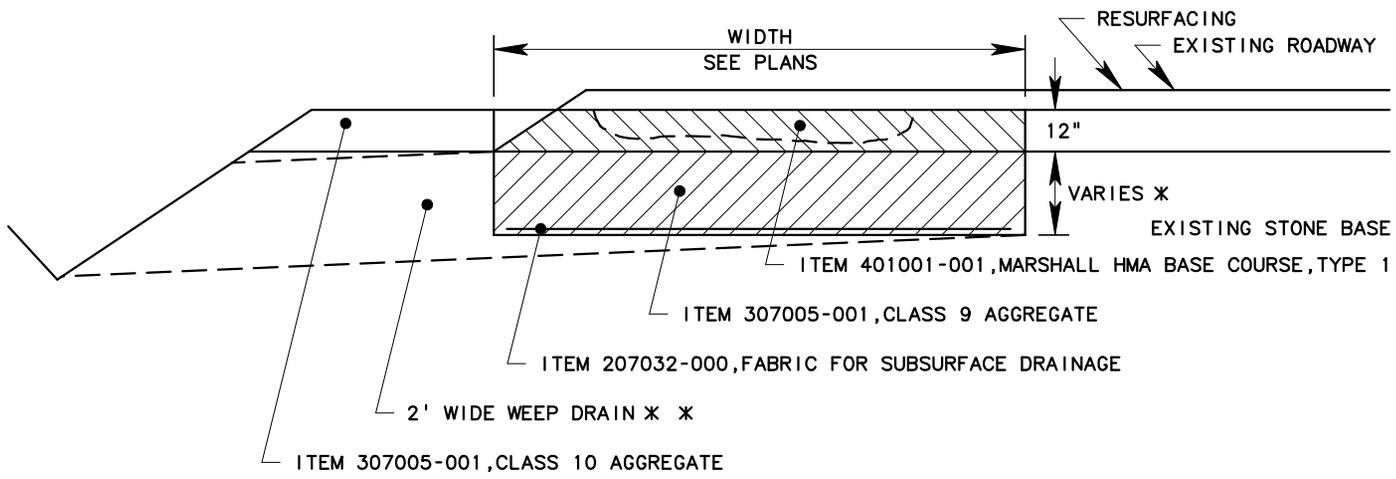
NOTES:  
The pavement design for this project shall be in accordance with \_\_\_\_\_ Traffic Design.

\* GUARDRAIL TO BE LOCATED AT THE PREVAILING OFFSET IN ADJACENT SECTIONS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**TYPICAL SECTION FOR BASE FAILURE - PARTIAL WIDTH**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

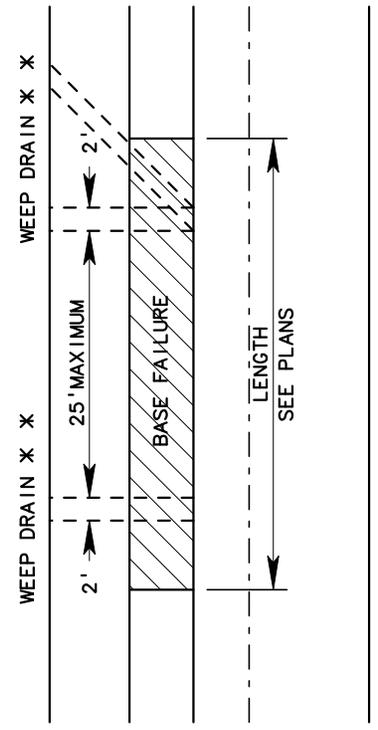


(ELEVATION VIEW)

 TRENCH EXCAVATION SHALL BE SHAPED TO FROM A SQUARE OR RECTANGLE WHOSE SIDES ARE PARALLEL WITH AND AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC. PAVEMENT SHALL BE SAW CUT AND SIDES OF TRENCH EXCAVATED TO NEAR VERTICAL AS POSSIBLE. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE TRENCH BOTTOM PRIOR TO PLACING FABRIC. PAYMENT FOR EXCAVATION TO BE ITEM 207001-001, UNCLASSIFIED EXCAVATION.

\* THICKNESS OF ITEM 307005-001, CLASS 9 AGGREGATE, TO BE AS DIRECTED BY THE ENGINEER (ESTIMATED AT 6")

\* \* WEEP DRAINS SHALL BE LOCATED AT ALL LOW POINTS IN TRENCH. MAXIMUM SPACING BETWEEN WEEP DRAINS SHALL BE TWENTY FIVE (25) FEET. DRAINS MAY BE SKEWED WHERE NECESSARY TO MAINTAIN SLOPE AWAY FROM THE TRENCH AREA. PAYMENT FOR WEEP DRAINS TO BE INCLUDED IN ITEM 307005-001, CLASS 9 AGGREGATE BASE COURSE.

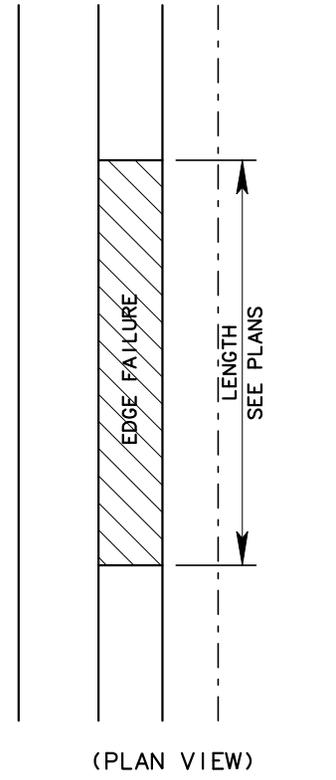
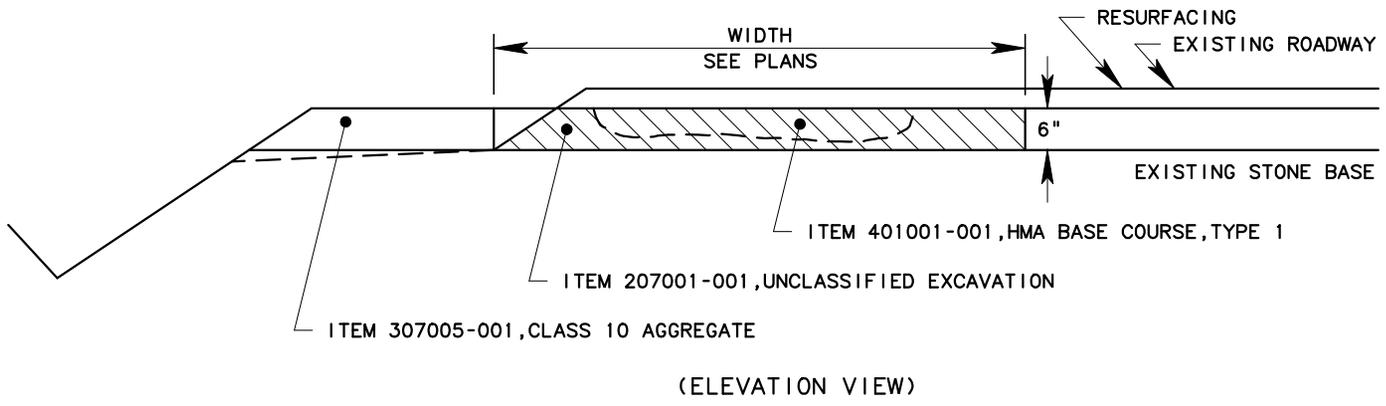


(PLAN VIEW)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# BASE FAILURE REPAIR DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



 TRENCH EXCAVATION SHALL BE SHAPED TO FROM A SQUARE OR RECTANGLE WHOSE SIDES ARE PARALLEL WITH AND AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC. PAVEMENT SHALL BE SAW CUT AND SIDES OF TRENCH EXCAVATED TO NEAR VERTICAL AS POSSIBLE. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE TRENCH BOTTOM PRIOR TO PLACING HMA.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# EDGE FAILURE REPAIR DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				





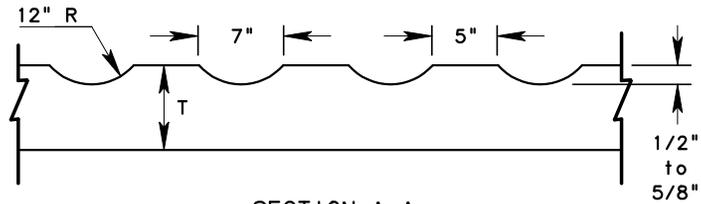
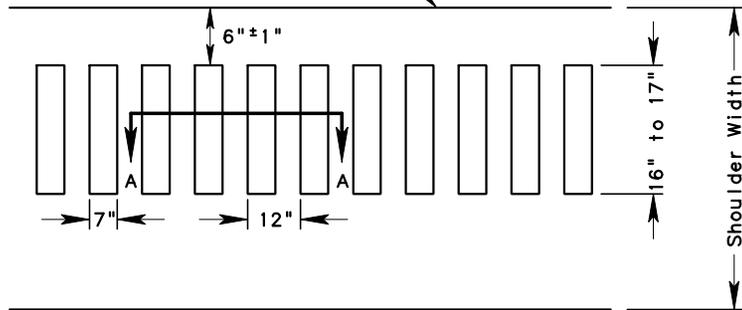


DEVICE	DESCRIPTION	VALUE IN UNITS	QUANTITY	TOTAL UNITS
* 1	SIGNS ON PORTABLE MOUNTS AND BARRICADES. (Total Sign Area 16 SQ.FT. or Greater.)	170		
* 2	SIGNS ON PORTABLE MOUNTS AND BARRICADES. (Total Sign Area Less Than 16 SQ.FT.)	80		
* 3	SIGNS ON PERMANENT POSTS. (Total Sign Area 16 SQ.FT. or Greater.)	180		
* 4	SIGNS ON PERMANENT POSTS. (Total Sign Area Less Than 16 SQ.FT.)	90		
* 5	BARRICADES - Type I	35		
* 6	BARRICADES - Type II	60		
* 7	BARRICADES - Type III	90		
** 8	DRUMS	60		
9	CONES	5		
10	VERTICAL PANELS OR GROUND MOUNTED DELINEATORS	10		
11	BARRIER OR GUARDRAIL MOUNTED DELINEATORS. (To Be Bid Incidental To The Cost of The Barrier or Guardrail.)	0		
12	TEMPORARY OVERLAYS AND TEMPORARY OVERSIZED SIGNS	300		
13	CHANNELIZER CONES	40		
* - ORANGE SIGN SHEETING TO BE REFLECTIVE FLOURESCENT ORANGE-TYPE V (Roll-Up Signs) OR TYPE IX OR XI (Rigid Signs)		TOTAL		
** - DRUM SHEETING TO BE 6" TYPE III				

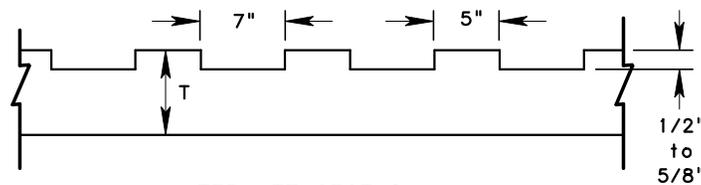
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS  
**TEMPORARY TRAFFIC CONTROL DEVICE QUANTITY TABLE**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

Pavement/Shoulder Joint  
(Edge of travelled way)



SECTION A-A  
(MILLED RUMBLE STRIP)



ALTERNATE SECTION A-A  
(SAWED RUMBLE STRIP)

**NOTES**

RUMBLE STRIPS SHALL BE PLACED IN HMA SHOULDERS WHERE THE SHOULDER WIDTH IS 8' OR GREATER AND/OR IN THE MEDIAN SHOULDERS WHERE THE SHOULDER WIDTH IS 3' OR GREATER.

RUMBLE STRIP PLACEMENT WILL BE CONTINUOUS ON HMA SHOULDERS UNLESS OTHERWISE NOTED.

RUMBLE STRIPS MAY BE SAWED OR MILLED UNLESS OTHERWISE INDICATED. THE TOP OF THE RUMBLE STRIPS WILL BE NO HIGHER THAN THE TOP SURFACE OF THE PAVEMENT. ANY FAULTY OR INCORRECTLY INSTALLED RUMBLE STRIPS WILL BE CORRECTED AT THE CONTRACTORS EXPENSE.

COST FOR RUMBLE STRIPS SHALL BE PAID FOR UNDER UNIT BID PRICE FOR [ITEM 410001-002], SAWED RUMBLE STRIP PER L.F. NOTE THAT L.F. OF RUMBLE STRIP IS MEASURED BY THE LINEAR FOOT OF PAVED SHOULDER TO RECEIVE RUMBLE STRIPS.

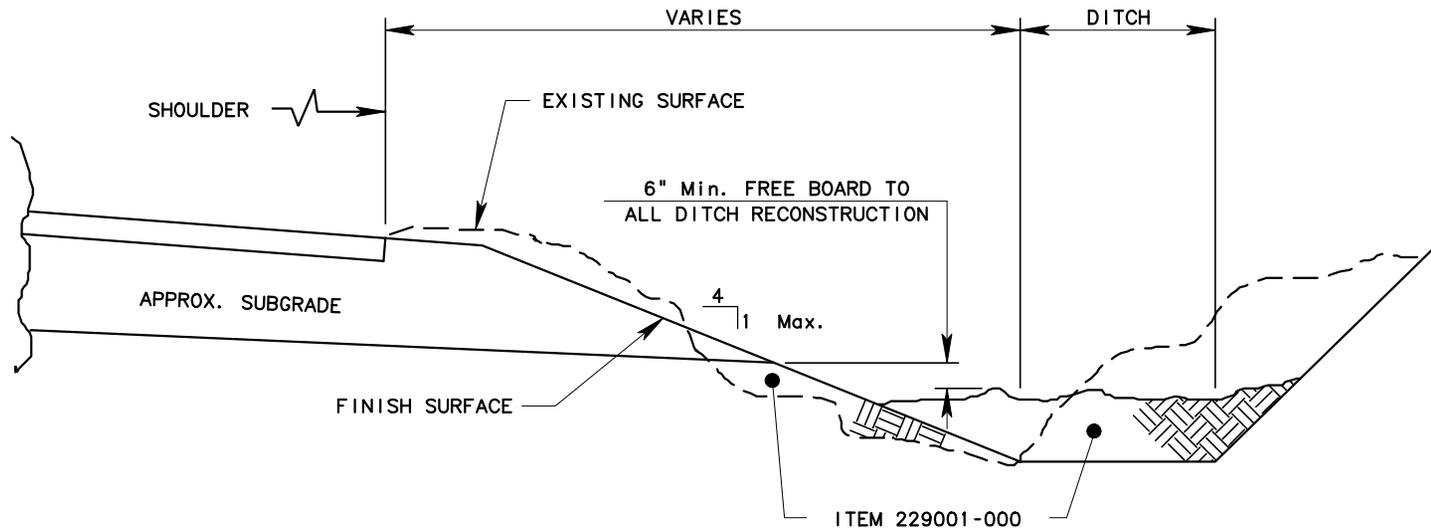
SEE "PROJECT NOTES" FOR ADDITIONAL COMMENTS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**SAWED/MILLED RUMBLE STRIP FOR HOT-MIX ASPHALT SHOULDERS**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

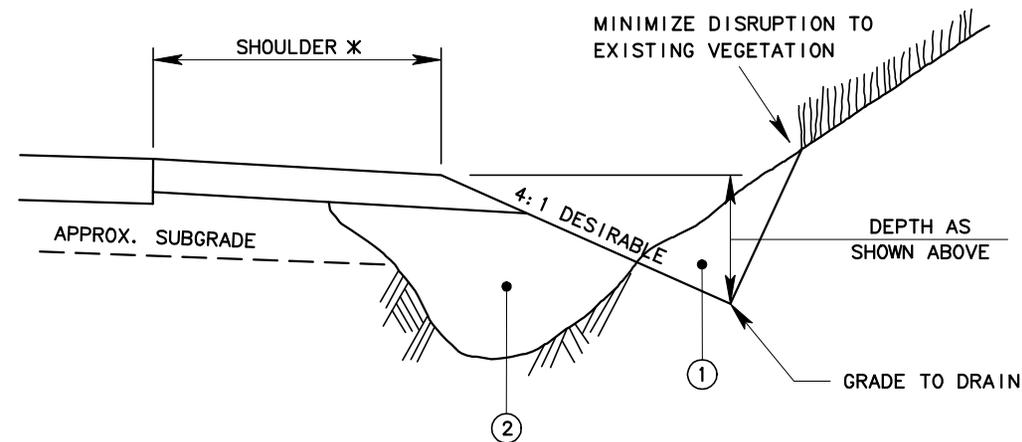
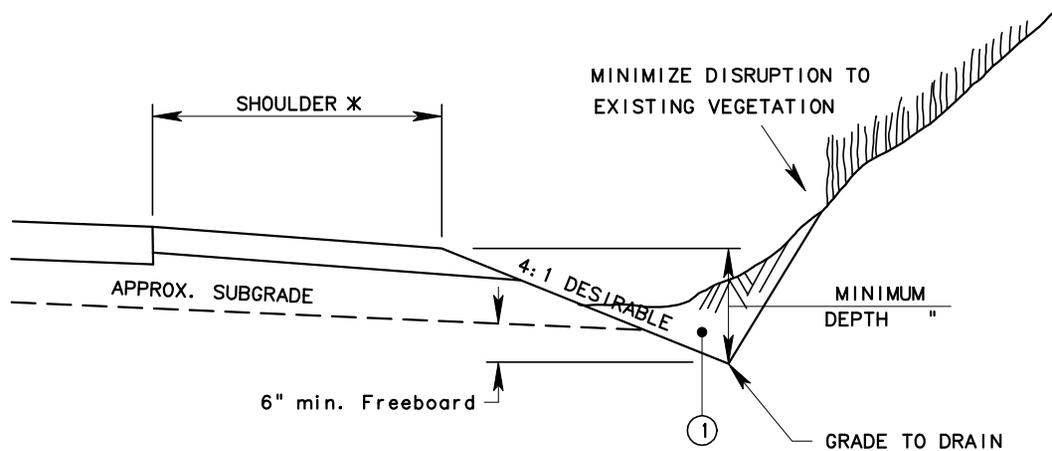
USE ON INTERSTATE & APD PROJECTS



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**MEDIANS, SHOULDERS AND DITCHES**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



X WIDTH, SLOPE, AND MATERIAL AS SPECIFIED ON TYPICAL SECTIONS AND SHOULDER RECONSTRUCTION DETAIL.

**LEGEND**

① Item 229001-000, Shoulders & Ditches

This operation is intended to be minor shaping and scarifying of existing shoulder material plus shaping of ditches for proper drainage without leaving ditch soil on the shoulder area. This operation also includes cleaning of existing structure outlets and inlets.

② Item 211008-000, Rock Borrow Excavation

The intent of this item is to provide proper foundation for the shoulder while restoring the original shoulder width reduced by erosion. Additional material, as directed by the engineer, may be required by recent erosion and will be paid for as 211008- , Rock Borrow Excavation.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**SHOULDER AND DITCHES**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

INTERSTATE & APD PROJECTS

NOTES:

All modifications are to be seeded, mulched, and fertilized. Fertilizer, seeding, and mulching will be as specified in Section 652 of the Standard Specifications. No additional payment will be made for this work. The cost of this work will be included in the unit bid price for 211001-000, Unclassified Borrow Excavation.

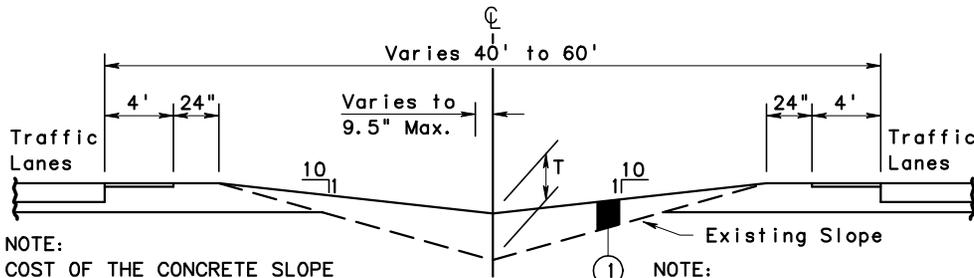
Existing guardrail is to be removed prior to grading for median modifications. Drums will be placed on 25' centers along the shoulders for the entire length of the modification until the guardrail has been re-installed. All work related to the median modifications, ie, removing existing guardrail, adjusting inlets, installing pipes, grading, seeding, mulching, fertilizing, concrete slope walls, and installing or resetting guardrail, should be completed in such a manner as to be a continuous operation. The proposed guardrail is to be re-established within 72 hours (3 days) from initial removal.

If the guardrail is not re-established after three days and the adjacent lane is open to traffic, the contractor is required to install a positive barrier system consisting of temporary concrete barrier attached to the bridge parapet walls by approved connections and approach end treatments. This positive barrier system will remain in place until the guardrail is permanently installed. The cost of this work will be incidental to Item 211001-000 and no additional payment will be made.

All details and notes from Standard Detail Sheet GR8MS shall apply to this project.

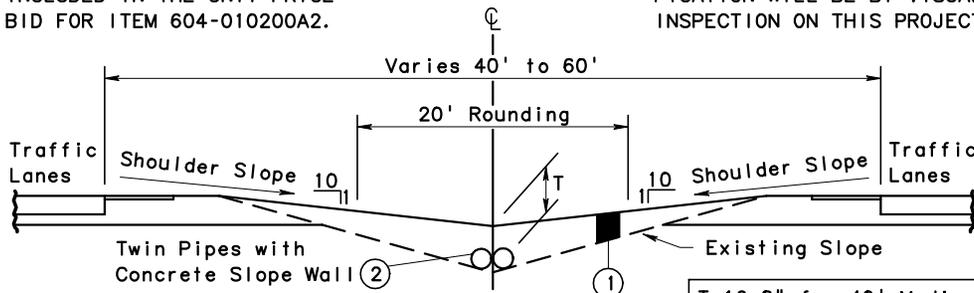
Where existing median underdrain outlet pipes are in the proposed median modification location, the outlet pipes are to be connected to the proposed twin pipes or existing inlets and modified to allow for proper drainage as directed by the project engineer. No additional payment will be made for this work. Cost to be included in the bid price for Item 211001-000, Unclassified Borrow Excavation.

For length of modification, see Median Modification Table.



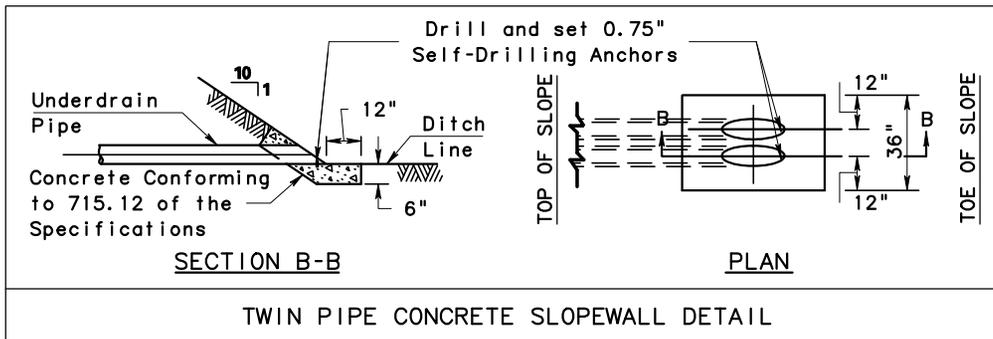
NOTE:  
COST OF THE CONCRETE SLOPE WALL AND/OR CONNECTIONS TO EXISTING INLETS WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 604-010200A2.

NOTE:  
COMPACTION FOR THE TWIN PIPES IN THE MEDIAN MODIFICATION WILL BE BY VISUAL INSPECTION ON THIS PROJECT.



LEGEND

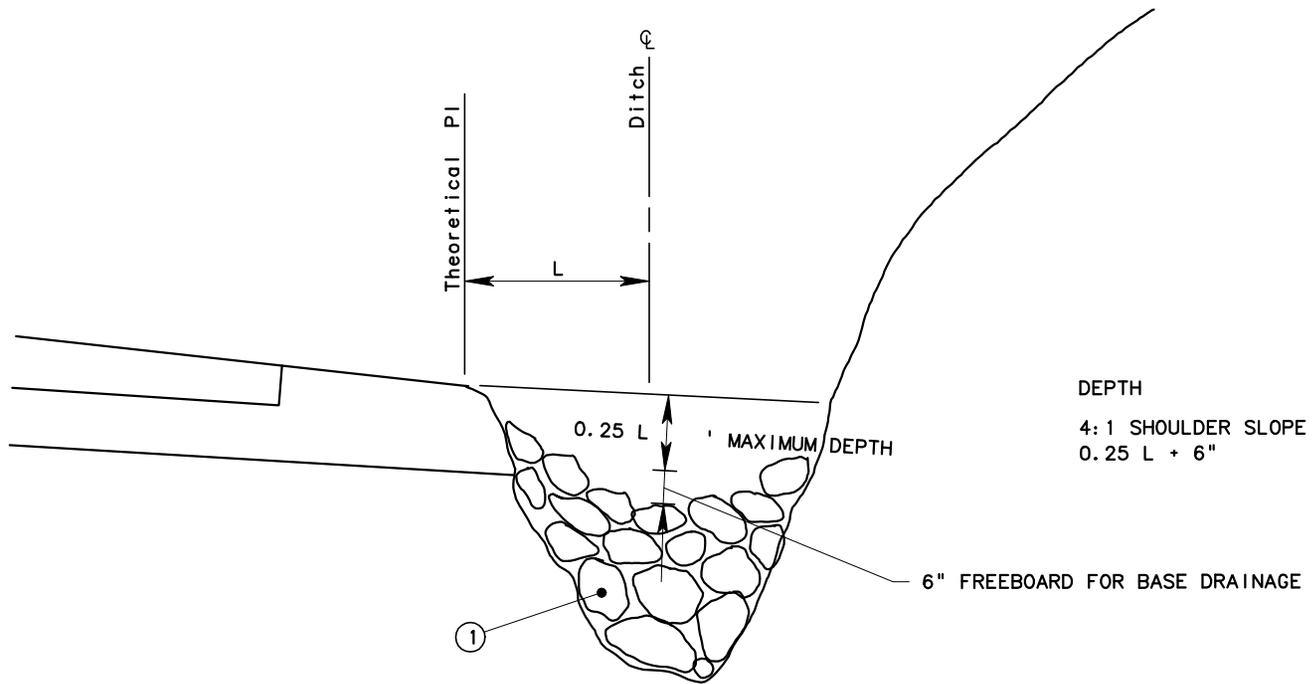
- ① ITEM 211001-000, UNCLASSIFIED BORROW EXCAVATION
- ② ITEM 604001-006, 8 INCH METALIC COATED CURRUGATED STEEL PIPE



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

MEDIAN MODIFICATION AT BRIDGES AND MEDIAN OBSTACLES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



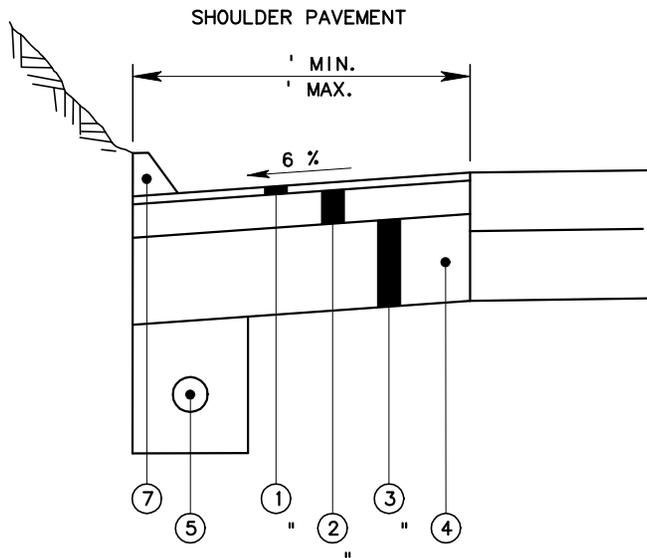
① Item 211008-000, ROCK BORROW EXCAVATION

The intent of this operation is to eliminate hazardous ditch areas where erosion, especially on steep grades, has deepened the ditches beyond the limits of safe vehicle operation. The maximum size of rock in the top layer should be 4"; however, larger rock will be permitted in lower layers as appropriate for the conditions.

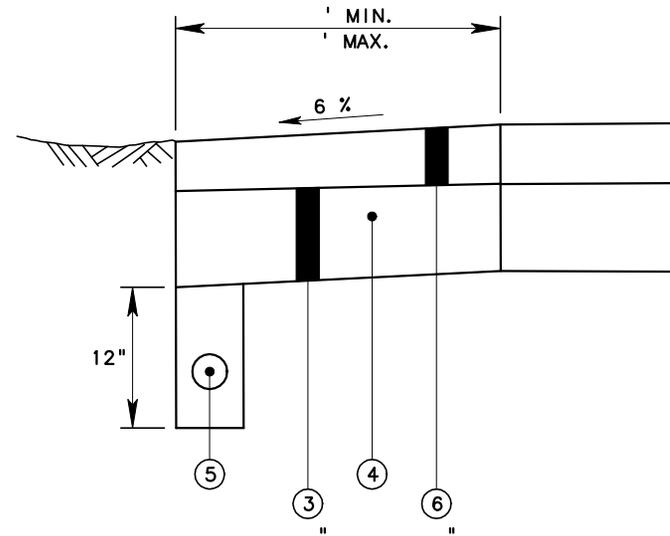
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## CORRECTING DEEP DITCHES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



CURB SECTION ALONG HILL



SHOULDER IN FLAT AREA

LEGEND

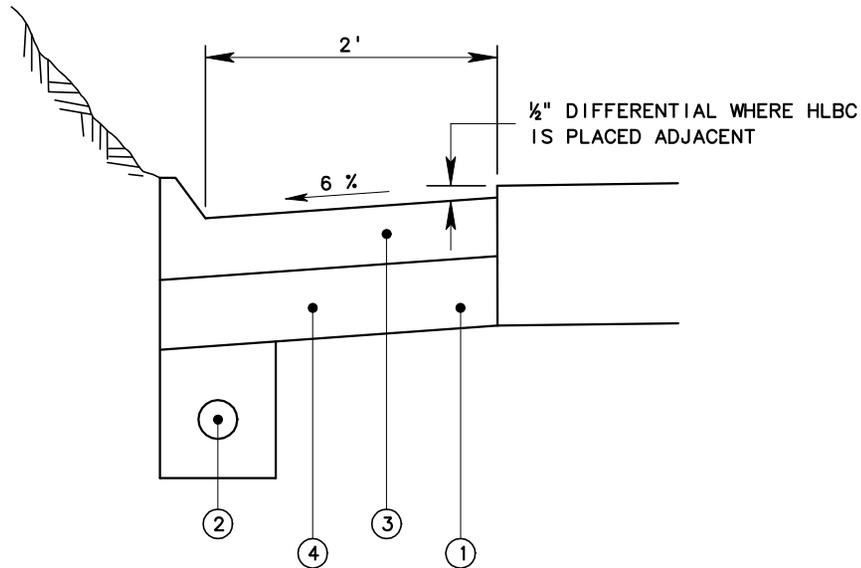
- ① ITEM 401002- , HOT-MIX ASPHALT WEARING COURSE, TYPE
- ② ITEM 401001- , HOT-MIX ASPHALT BASE COURSE, TYPE
- ③ ITEM 307001-00 , AGGREGATE BASE COURSE, CLASS
- ④ ITEM 207001-001, UNCLASSIFIED EXCAVATION
- ⑤ ITEM 606025- , INCH UNDERDRAIN PIPE OR ITEM 606020- FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS
- ⑥ ITEM 307005-001, AGGREGATE BASE COURSE, STONE OR GRAVEL, CLASS 10  
ITEM 307005-001, AGGREGATE BASE COURSE, SLAG, CLASS 10
- ⑦ ITEM 610005- , BITUMINOUS CURBING, TYPE

NOTE: SURFACE DRAINAGE TO BE COLLECTED IN A POSITIVE MANNER AS SHOWN IN THE PLANS.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**NON - DITCH DETAILS**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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LEGEND

- ① ITEM 307001-00 , AGGREGATE BASE COURSE, CLASS
- ② ITEM 606025- , INCH UNDERDRAIN PIPE OR ITEM 606020- , FABRIC UNDERDRAIN, AS SPECIFIED IN PLANS
- ③ ITEM 610003- , COMBINATION CONCRETE CURB AND GUTTER, TYPE
- ④ ITEM 207001-001, UNCLASSIFIED EXCAVATION

NOTE: SURFACE DRAINAGE TO BE COLLECTED IN A POSITIVE MANNER AS SHOWN IN THE PLANS.

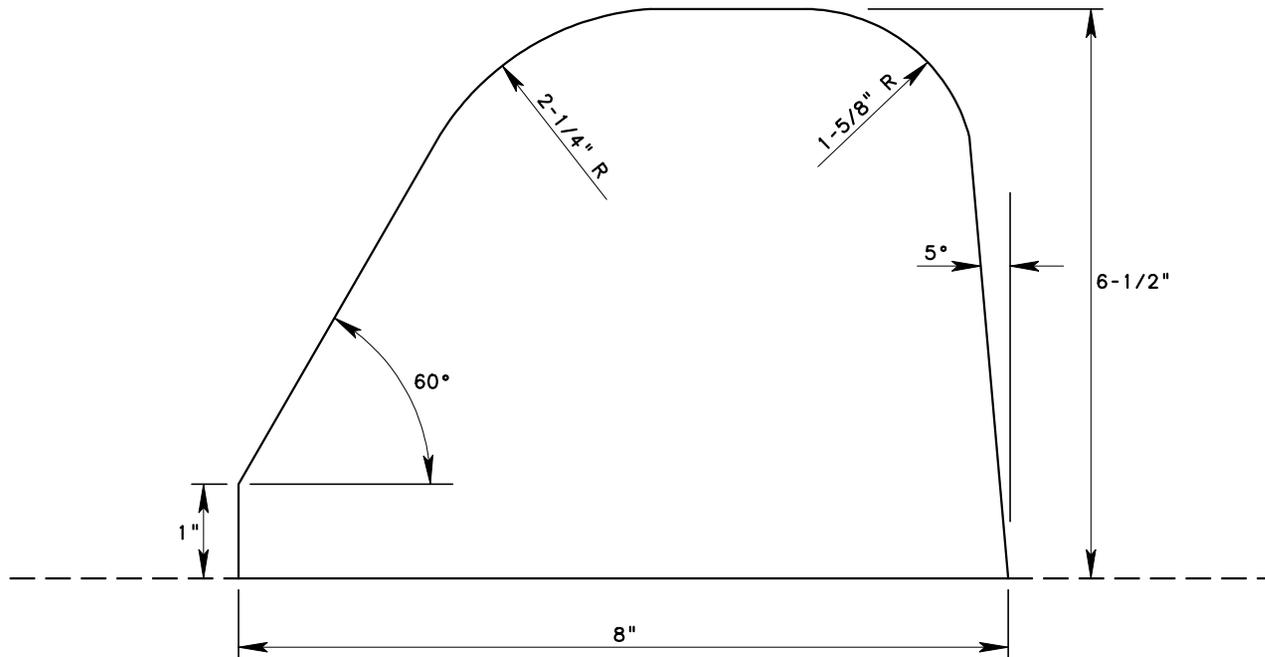
FOR ADDITIONAL DIMENSIONS SEE STANDARD PVT6 THIS DETAIL IS TO BE USED IN SPECIAL CASES ONLY.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

NON - DITCH DETAILS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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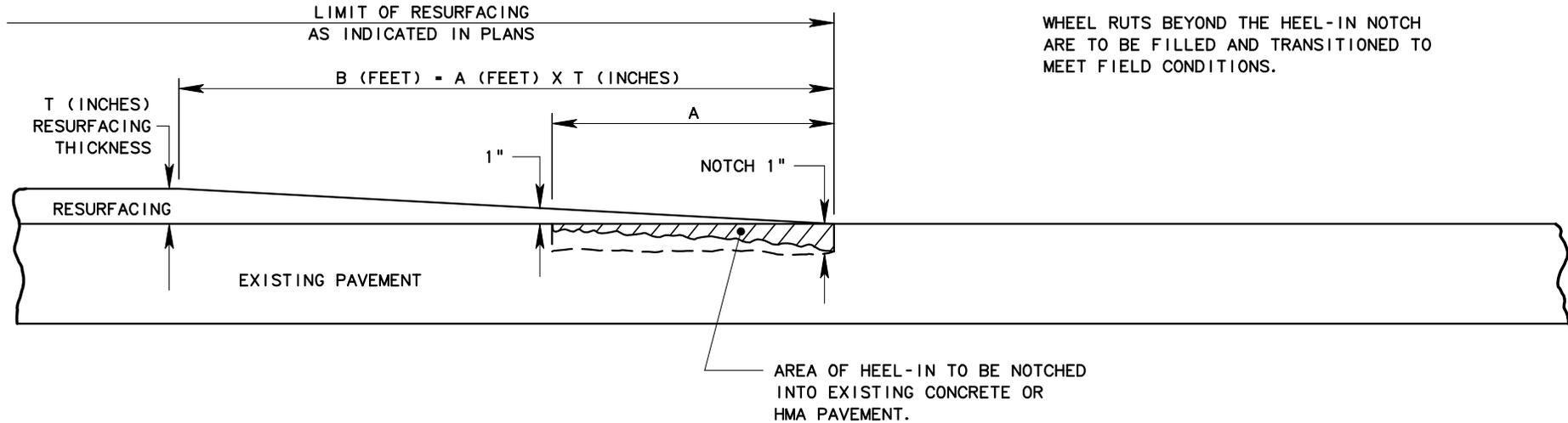
ITEM 610005-002, BITUMINOUS CURB, TYPE II

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS  
**BITUMINOUS CURBING - TYPE II**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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**TEMPORARY WEDGES AT HEEL-INS**

THE CONTRACTOR MAY ELECT TO CUT THE REQUIRED HEEL-INS SUCH THAT TRAFFIC MUST BE MAINTAINED OVER THE HEEL-IN AREAS PRIOR TO THE PLACEMENT OF THE PERMANENT HMA MATERIAL. IF THE CONTRACTOR CHOOSES THIS METHOD AS AN ALTERNATE TO CUTTING THE HEEL-INS AND BACKFILLING WITH PERMANENT HMA PRIOR TO RESTORING TRAFFIC. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PLACE TEMPORARY HMA WEDGES 10 FEET IN LENGTH FOR EACH 1 INCH OF EXISTING SURFACE REMOVED AT THE VERTICAL FACE. FOR EXAMPLE, IF 2 INCHES ARE REMOVED AT THE VERTICAL FACE, THE TEMPORARY HMA WEDGE SHALL BE 20 FEET IN LENGTH. THE WEDGES SHALL BE CONSTRUCTED OF ITEM 401001-011, TYPE 19, PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 401.14. THESE TEMPORARY WEDGES SHALL BE REMOVED IMMEDIATELY PRIOR TO PLACING THE PERMANENT SURFACE. THE COST OF THIS WORK WILL BE INCLUDED IN VARIOUS PAVEMENT ITEMS.



WHEEL RUTS BEYOND THE HEEL-IN NOTCH ARE TO BE FILLED AND TRANSITIONED TO MEET FIELD CONDITIONS.

AREA OF HEEL-IN TO BE NOTCHED INTO EXISTING CONCRETE OR HMA PAVEMENT.

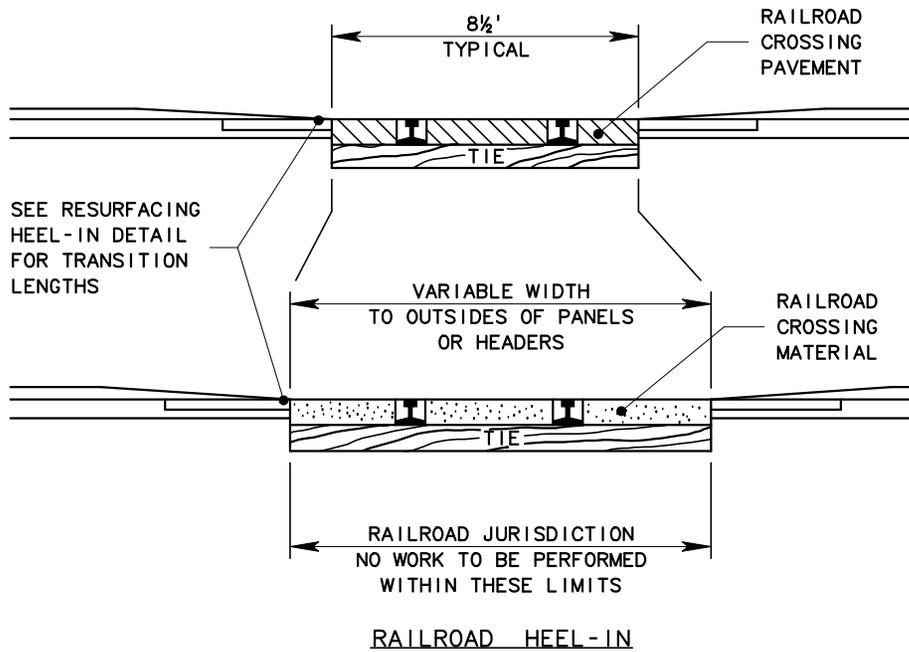
1. PAYMENT FOR HEEL-IN TO BE INCLUDED IN VARIOUS PAY ITEMS OF THIS PROJECT
2. THIS DETAIL TO BE USED AT TERMINI OF RESURFACING PROJECTS AND AT ALL TERMINI FOR SKIP RESURFACING PROJECTS.
3. THIS DETAIL TO BE USED AT LOCATIONS FOR HEEL-IN INTERSECTIONS OF THIS PROJECT.
4. THE FOLLOWING NUMBER(S) OF HEEL-INS FOR THE MAINLINE ON THIS PROJECT SHALL BE:  
 PERPENDICULAR  
 SKEWED AT °

POSTED SPEED LIMIT	A
25 mph	12'
30 TO 35 mph	14'
40 TO 45 mph	16'
50 TO 55 mph	18'
60 TO 70 mph	25'

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

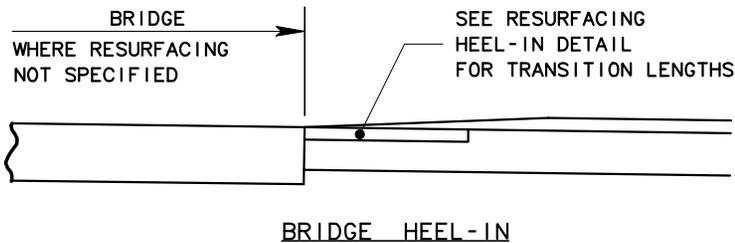
**RESURFACING HEEL-IN DETAIL**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



RAILROAD CROSSING HEEL-IN:

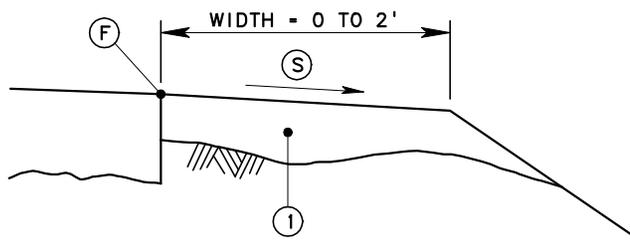
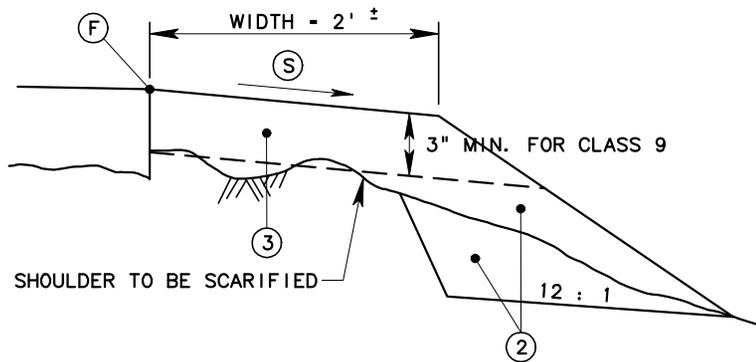
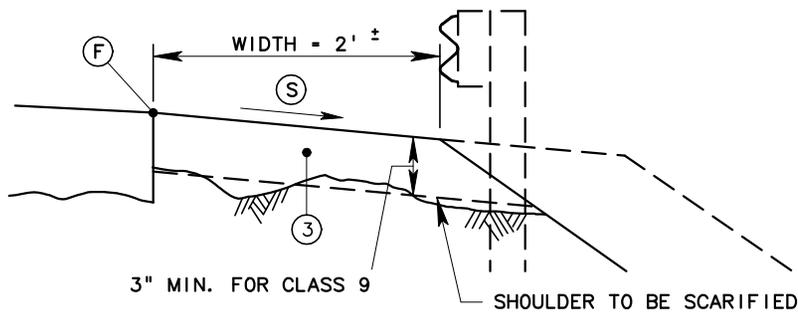
1. THE CONTRACTOR SHALL OBTAIN A RAILROAD FLAGGER(S) FROM THE AFFECTED RAILROAD PER SECTION 107.8, TO PERFORM THE SOLE TASK OF PROVIDING WARNINGS TO THE WORKMEN OF APPROACHING TRAINS WHILE WORK IS BEING PERFORMED AT THE RAILROAD CROSSING. THE COST SHALL BE INCLUDED IN THE SECTION 401 ITEMS.
2. THE CONTRACTOR SHALL AVOID DAMAGE TO THE CROSSING SURFACE MATERIAL AND ALL OTHER RAILROAD FACILITIES.
3. THIS HEEL-IN DETAIL APPLIES AT ALL TRACKS ENCOUNTERED ON THE PROJECT.
4. NO WORK SHALL BE PERFORMED WITHIN 10' OF THE CENTER OF THE RAILROAD TRACK WITHOUT PERMISSION OF THE AFFECTED RAIL ROAD.



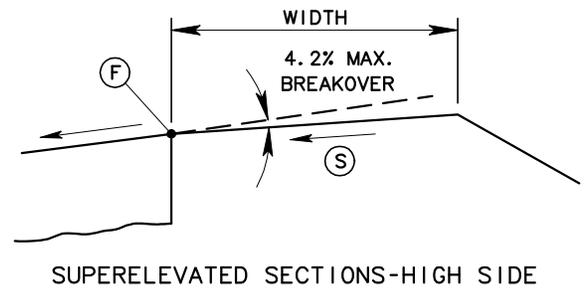
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# HEEL-IN AT RAILROAD CROSSINGS AND BRIDGES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



NORMAL SECTIONS



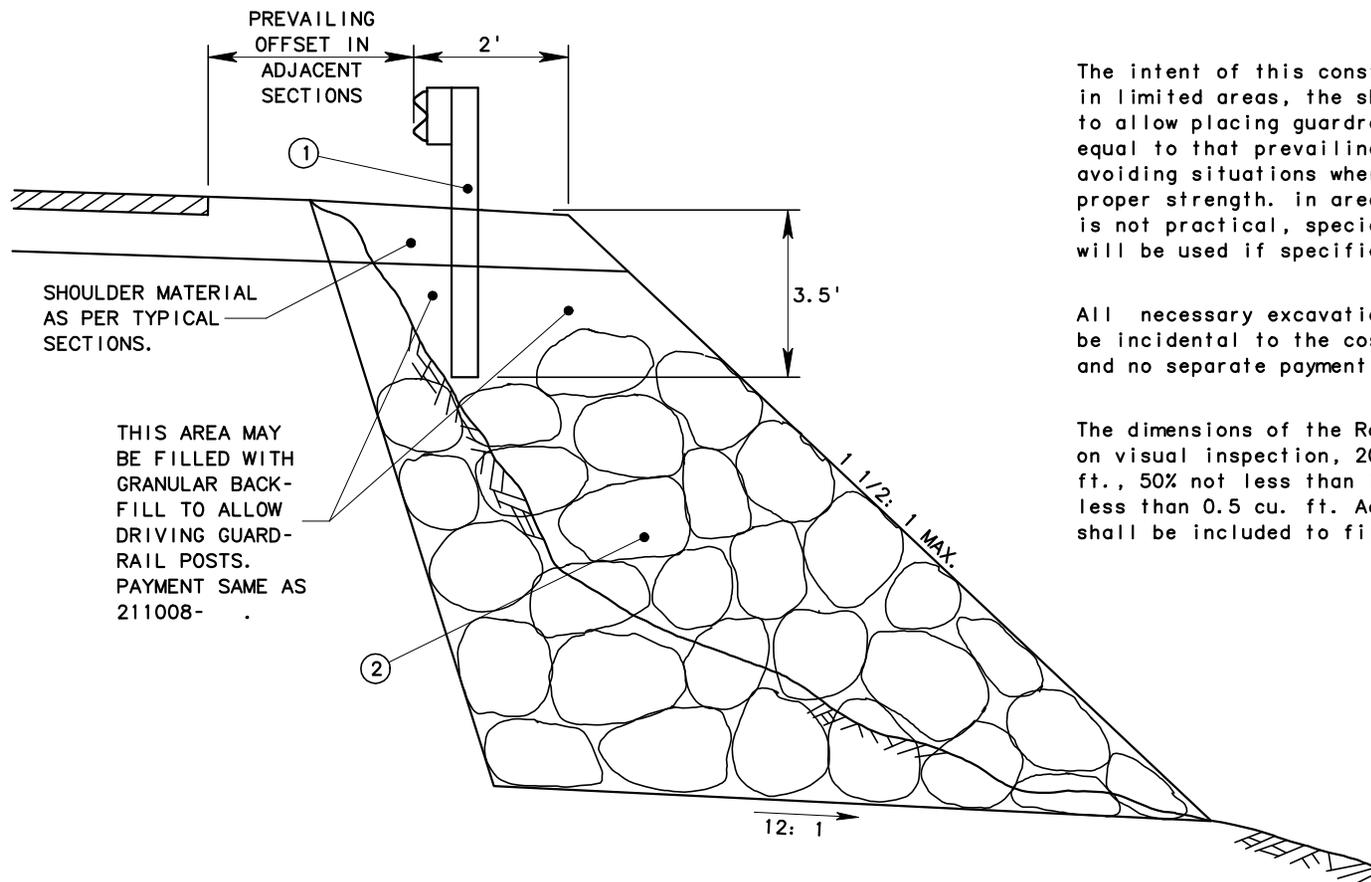
**LEGEND**

- ① ITEM 401001- , HOT-MIX ASHALT BASE COURSE, TYPE
- ② ITEM 211008-000, ROCK BORROW EXCAVATION  
The intent of this item is to provide proper foundation for the shoulder while restoring the original shoulder width reduced by erosion. Additional material, as directed by the Engineer, may be required by recent erosion and will be paid for as 211008-000. Excavation of benches for placing, 211008-000 will be included in 211008-000.
- ③ ITEM 307005-001, AGGREGATE BASE COURSE, CLASS 10  
This item includes any necessary removal of existing shoulder material to a minimum of 3" below the finished pavement elevation when Class 9 aggregate is specified. Material removed shall be reused within the project limits or wasted as directed by the Engineer. Scarifying shall be in accordance with Section 308.3.1 of the Specifications.
- (F) FINISHED PAVEMENT ELEVATION
- (S) SHOULDER SLOPE  
Normal Sections : 6 %.  
Superelevated : Match rate of superelevation or reduce as shown above  
Minimum slope to be ¼" per foot, on low side of superelevation.  
Paved Shoulders : 4 % or superelevated.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**SHOULDER RECONSTRUCTION**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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The intent of this construction is to restore, in limited areas, the shoulder width sufficiently to allow placing guardrail at an offset nearly equal to that prevailing in adjacent sections avoiding situations where posts would not provide proper strength. In areas where such construction is not practical, special designs such as piling will be used if specified in the plans.

All necessary excavation of the fill bench will be incidental to the cost of Items 211008-000, and no separate payment will be made.

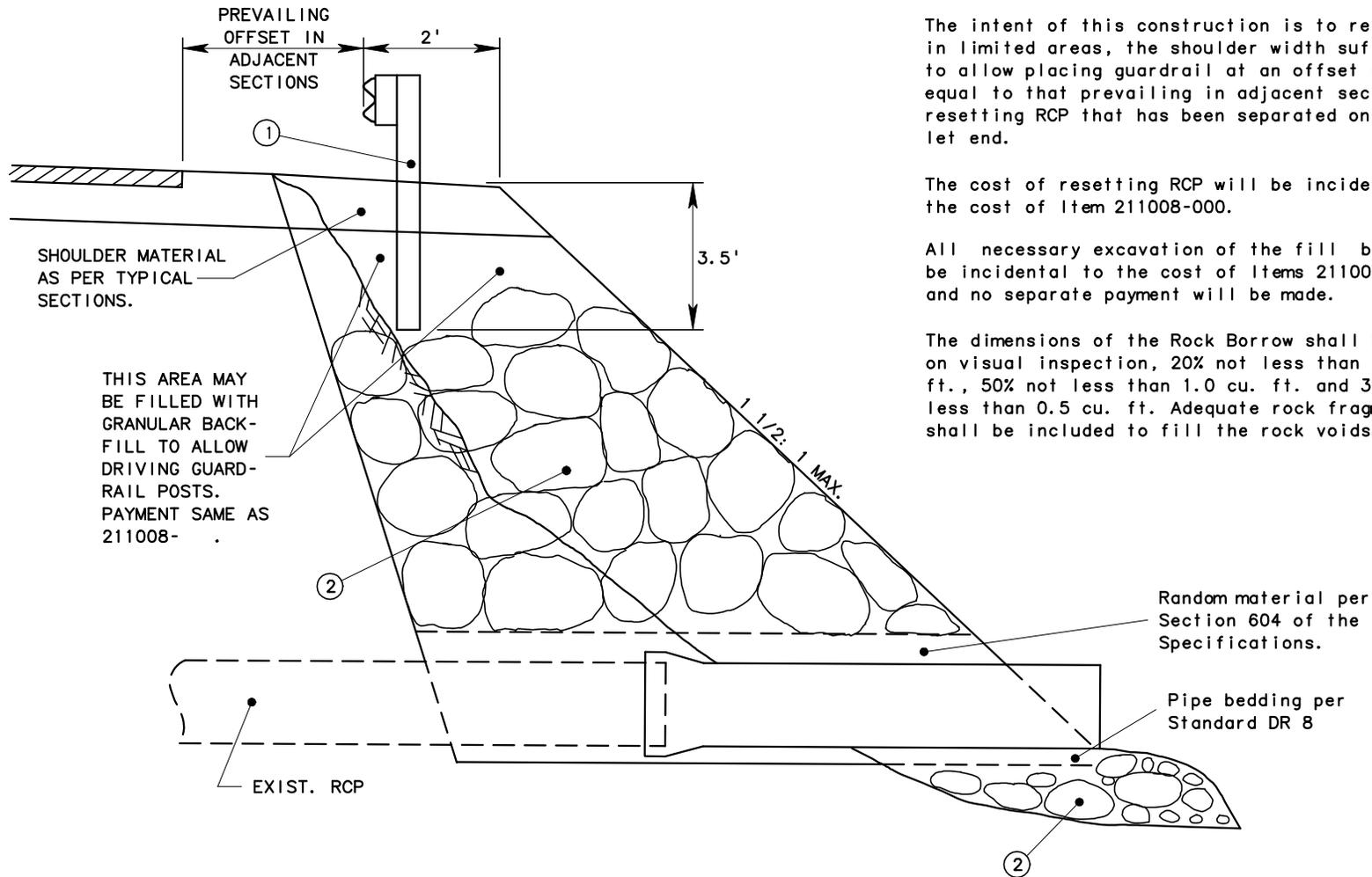
The dimensions of the Rock Borrow shall be, based on visual inspection, 20% not less than 1.5 cu. ft., 50% not less than 1.0 cu. ft. and 30% not less than 0.5 cu. ft. Adequate rock fragments shall be included to fill the rock voids.

- ① ITEM 607001-001, TYPE I GUARDRAIL, CLASS (AS SHOWN ON PLANS)
- ② ITEM 211008-000, ROCK BORROW EXCAVATION

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## RESTORING SHOULDERS FOR GUARDRAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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The intent of this construction is to restore, in limited areas, the shoulder width sufficiently to allow placing guardrail at an offset nearly equal to that prevailing in adjacent sections and resetting RCP that has been separated on the outlet end.

The cost of resetting RCP will be incidental to the cost of Item 211008-000.

All necessary excavation of the fill bench will be incidental to the cost of Items 211008-000, and no separate payment will be made.

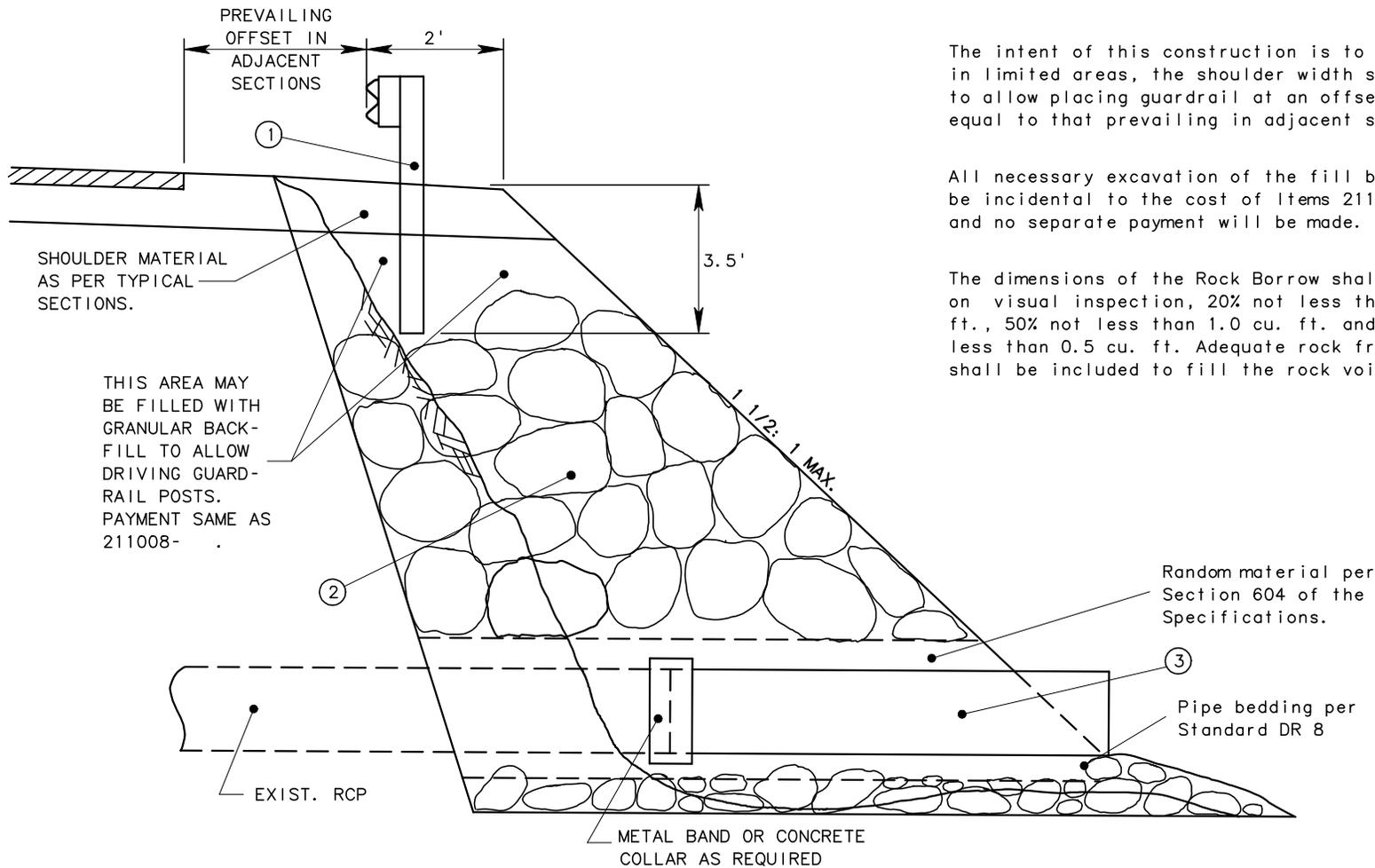
The dimensions of the Rock Borrow shall be, based on visual inspection, 20% not less than 1.5 cu ft., 50% not less than 1.0 cu. ft. and 30% not less than 0.5 cu. ft. Adequate rock fragments shall be included to fill the rock voids.

- ① ITEM 607001-001, TYPE I GUARDRAIL, CLASS (AS SHOWN ON PLANS)
- ② ITEM 211008-000, ROCK BORROW EXCAVATION

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## RESETTING RCP & RESTORING SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
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The intent of this construction is to restore, in limited areas, the shoulder width sufficiently to allow placing guardrail at an offset nearly equal to that prevailing in adjacent sections.

All necessary excavation of the fill bench will be incidental to the cost of Items 211008-000, and no separate payment will be made.

The dimensions of the Rock Borrow shall be, based on visual inspection, 20% not less than 1.5 cu. ft., 50% not less than 1.0 cu. ft. and 30% not less than 0.5 cu. ft. Adequate rock fragments shall be included to fill the rock voids.

THIS AREA MAY BE FILLED WITH GRANULAR BACK-FILL TO ALLOW DRIVING GUARD-RAIL POSTS. PAYMENT SAME AS 211008-

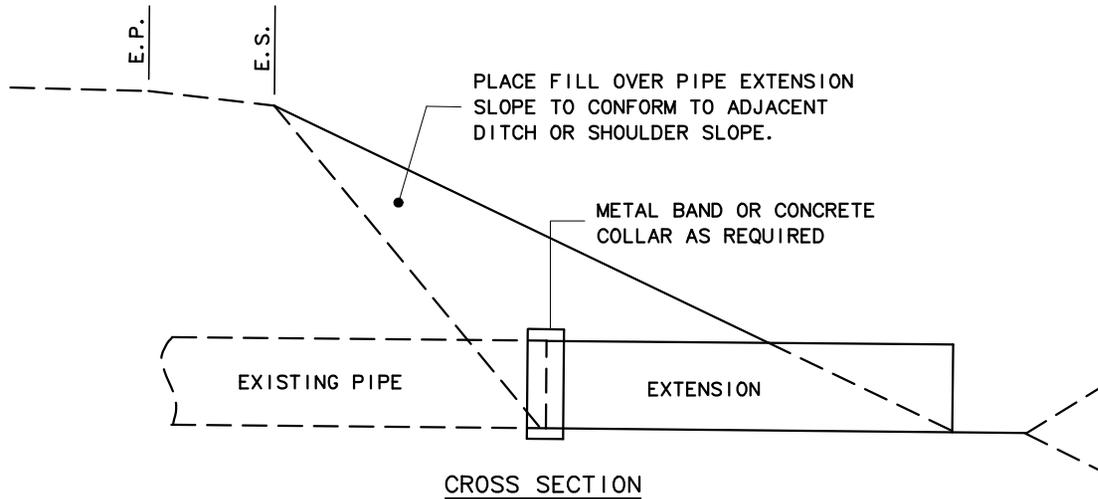
- ① ITEM 607001-001, TYPE I GUARDRAIL, CLASS (AS SHOWN ON PLANS)
- ② ITEM 211008-000, ROCK BORROW EXCAVATION
- ③ PIPE (AS SHOWN ON PLANS)

Testing of the pipe material will not be required, however; the Contractor will be required to provide certification that the material meets Section 604 of the Specifications.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## EXTENDING PIPE & RESTORING SHOULDERS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

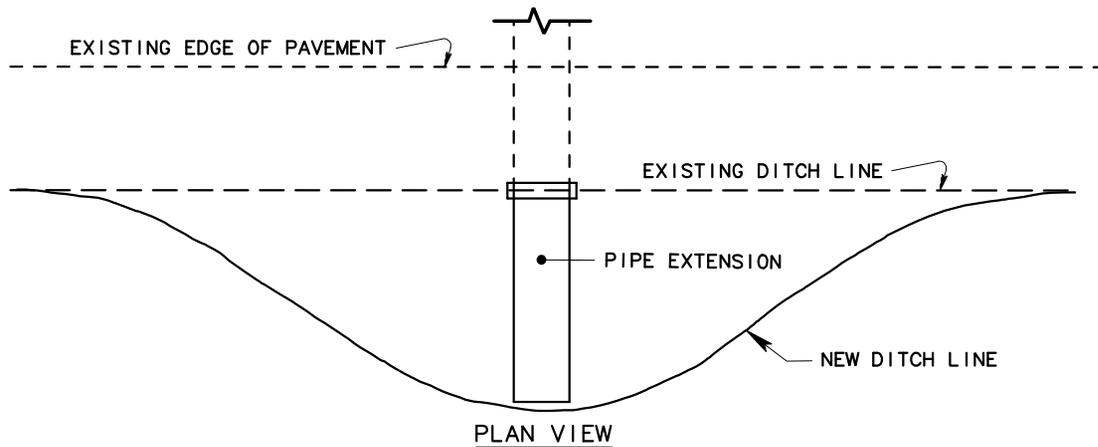


NOTES :

Fill area around pipe extension with suitable random material. Fill is to be placed in six inch loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

The cost of fill material and reshaping of existing ditch to new ditch grade is to be included in the unit bid price for pipe.

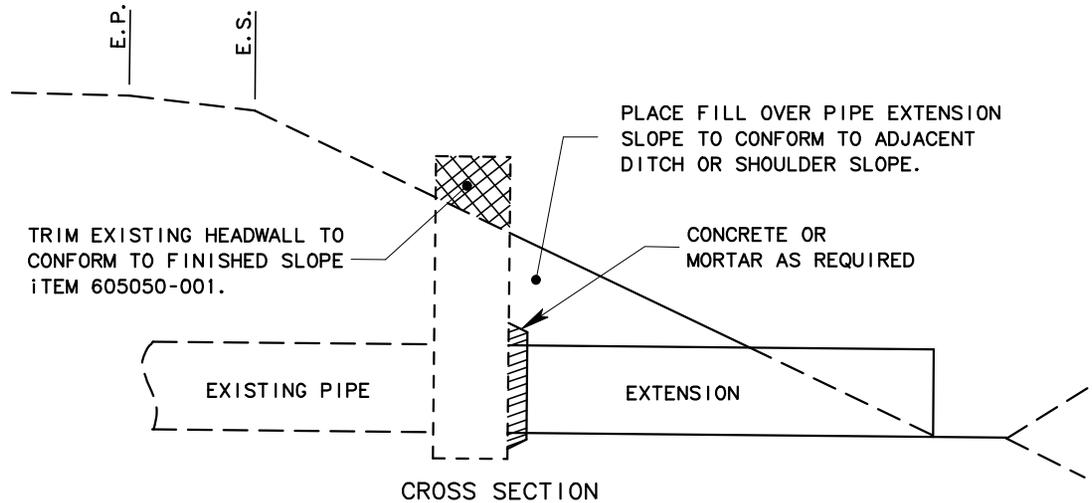
The size and type of pipe will be as called for on the plans. Testing of the pipe material will not be required, however; the Contractor will be required to provide certification that the material meets Section 604 of the Specifications.



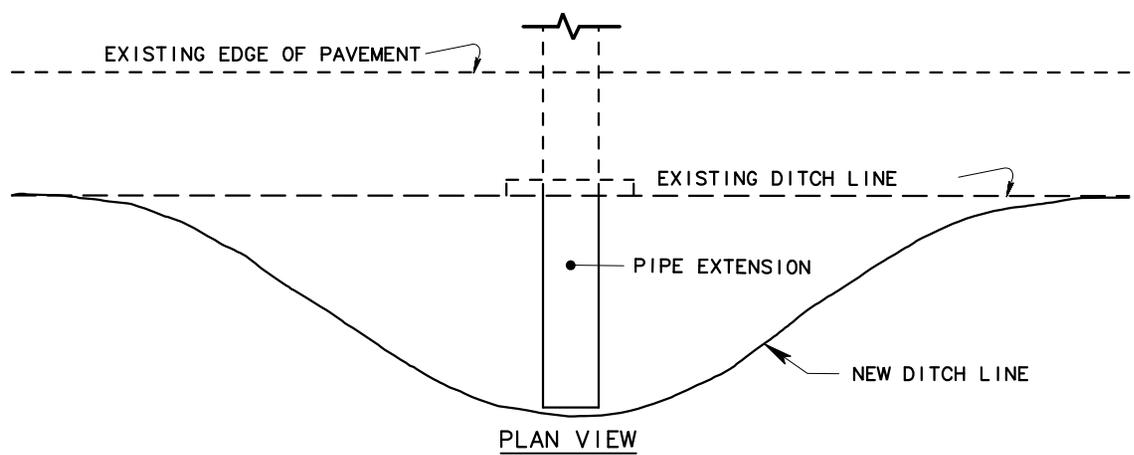
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**PIPE EXTENSION**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



CROSS SECTION



PLAN VIEW

**NOTES :**

Fill area around pipe extension with suitable random material. Fill is to be placed in six inch loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

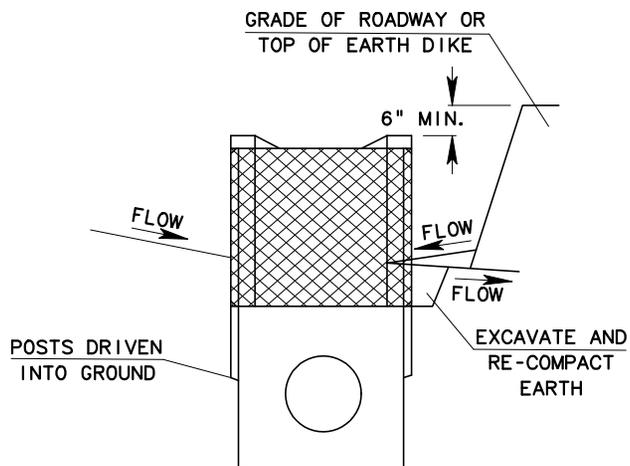
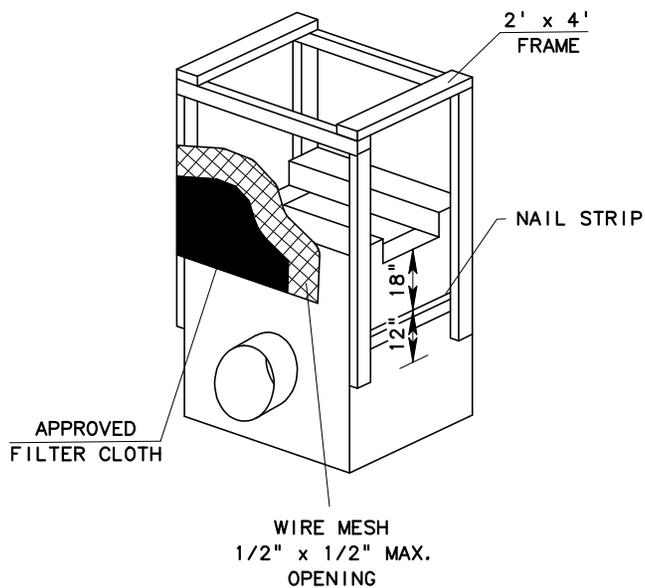
The cost of fill material and reshaping of existing ditch to new ditch grade is to be included in the unit bid price for pipe.

The size and type of pipe will be as called for on the plans. Testing of the pipe material will not be required, however the Contractor will be required to provide certification that the material meets Section 604 of the Specifications. Testing of the concrete or mortar is not required.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**PIPE EXTENSION AT HEADWALL**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



STANDARD INLET PROTECTION DETAIL (SIP) OR AND APPROVED EQUAL.

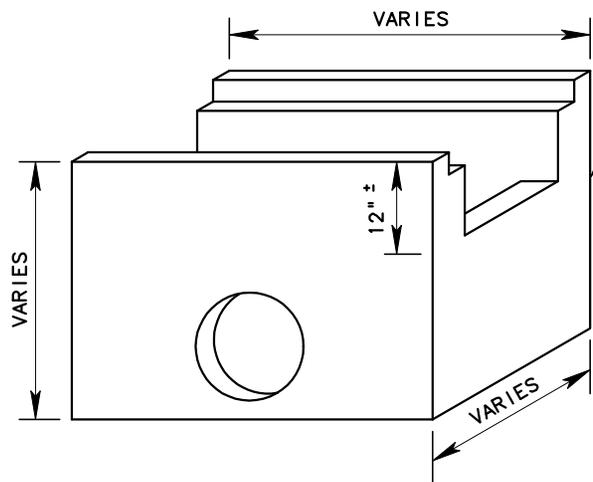
STANDARD INLET PROTECTION CONSTRUCTION SPECIFICATIONS

1. EXCAVATE COMPLETELY AROUND THE INLET TO A DEPTH OF 18" BELOW THE NOTCH ELEVATION.
2. DRIVE THE 2" X 4" CONSTRUCTION GRADE LUMBER POST 1' INTO THE GROUND AT EACH CORNER OF THE INLET. PLACE NAIL STRIPS BETWEEN THE POSTS ON THE ENDS OF INLET. ASSEMBLE THE TOP PORTION OF THE 2' X 4' FRAME USING THE OVERLAP JOINT SHOWN ON DETAIL 23A. THE TOP OF THE FRAME (WEIR) MUST BE 6" BELOW ADJACENT ROADWAYS WHERE FLOODING AND SAFETY ISSUES MAY ARRISE.
3. STRETCH THE 1/2" X 1/2" WIRE MESH TIGHTLY AROUND THE FRAME AND FASTEN SECURELY. THE ENDS MUST MEET AND OVERLAP AT A POST.
4. STRETCH THE GEOTEXTILE CLASS E TIGHTLY OVER THE WIRE MESH WITH THE GEOTEXTILE EXTENDING FROM THE TOP OF THE FRAME TO 18" BELOW THE INLET NOTCH ELEVATION. FASTEN THE GEOTEXTILE FIRMLY TO THE FRAME. THE ENDS OF THE GEOTEXTILE MUST MEET AT A POST, BE OVERLAPPED, AND FOLDED, THEN FASTENED DOWN.
5. BACKFILL AND COMPACT FILL MATERIAL UNTIL THE LAYER OF EARTH IS LEVEL WITH THE NOTCH ELEVATION ON THE ENDS AND TOP ELEVATION ON THE SIDES.
6. IF THE INLET IS NOT IN A SUMP, CONSTRUCT A COMPACTED EARTH DIKE ACROSS THE DITCH LINE DIRECTLY BELOW IT. THE TOP OF THE EARTH DIKE SHOULD BE AT LEAST 6" HIGHER THAN THE TOP OF THE FRAME.
7. THE STRUCTURE MUST BE INSPECTED PERIODICALLY AND AFTER EACH RAIN AND THE GEOTEXTILE REPLACED WHEN IT BECOMES CLOGGED.
8. PAY ITEM 642040-001 INLET PROTECTION EA.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

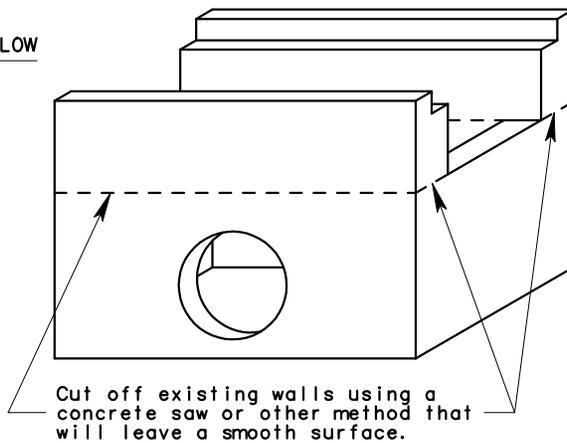
STANDARD INLET PROTECTION DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

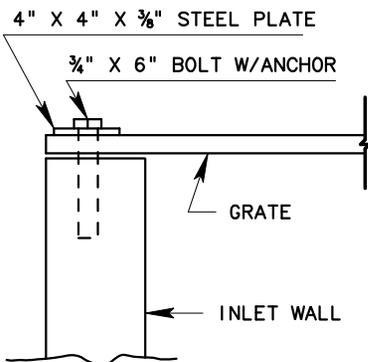
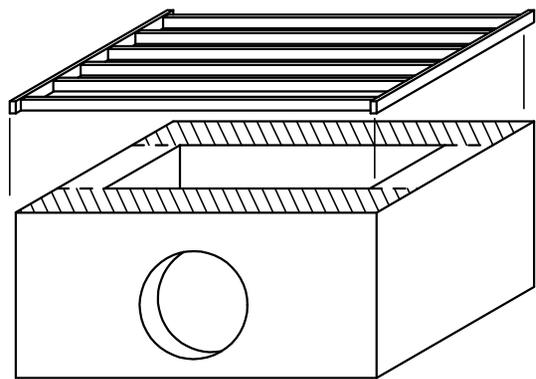


EXISTING INLET

DITCH FLOW



Cut off existing walls using a concrete saw or other method that will leave a smooth surface.



ANCHOR DETAIL

NOTES :

The Contractor will perform all work and supply all materials necessary to complete inlet modification as specified.

Use standard Type G Inlet grate of sufficient size to cover inlet opening.

Grate to be fabricated per Type G Inlet Standard Detail.

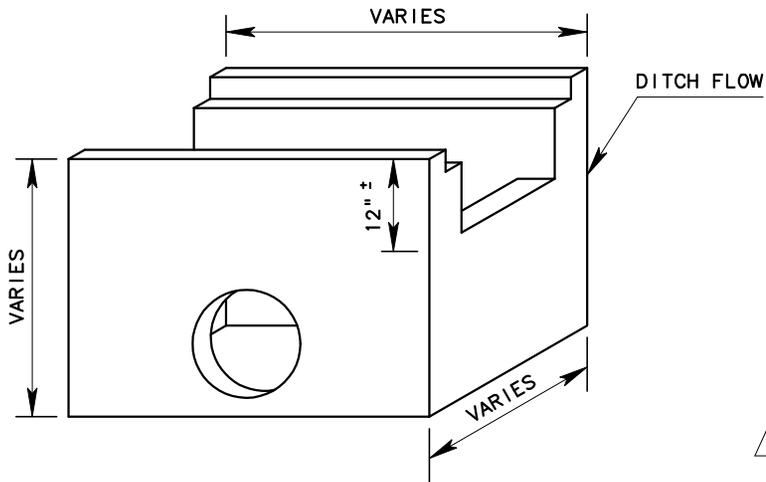
Anchors to be self-drill such as Star 3400 series Self-Drill Shield, Phillips Red Head Self-Drill Anchor or equal as approved by the Engineer.

Anchors to be placed in two sides (opposite). Testing requirements for the anchors has been waived.

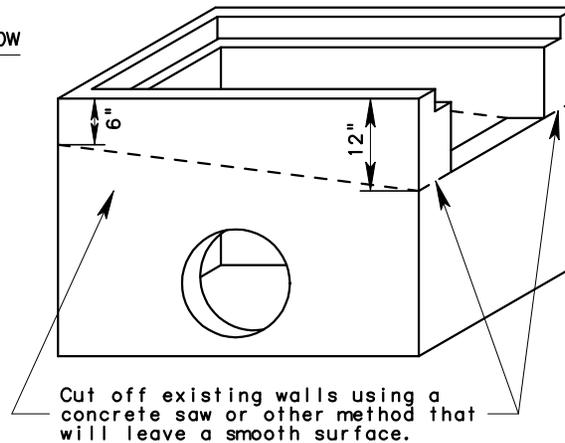
All work will be paid for as Item 605012-001, Adjust Inlet Type C, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS  
**ADJUSTING TYPE C INLET (FLAT)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



EXISTING INLET



NOTES :

The Contractor will perform all work and supply all materials necessary to complete inlet modification as specified.

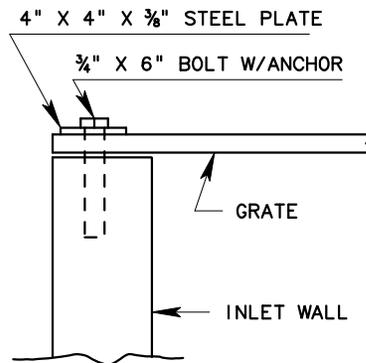
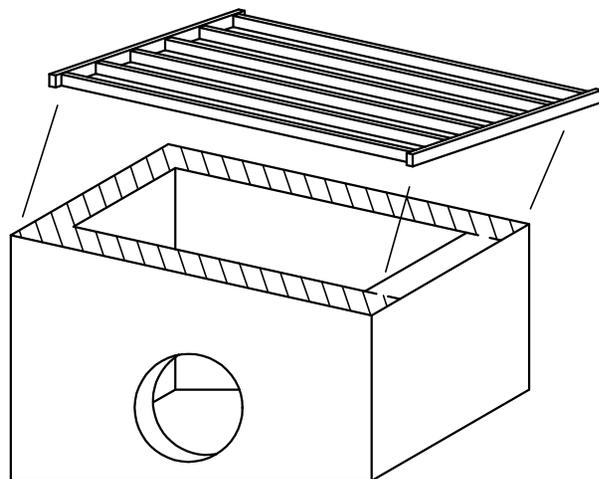
Use standard Type G Inlet grate of sufficient size to cover inlet opening.

Grate to be fabricated per Type G Inlet Standard Detail.

Anchors to be self-drill such as Star 3400 series Self-Drill Shield, Phillips Red Head Self-Drill Anchor or equal as approved by the Engineer.

Anchors to be placed in two sides (opposite). Testing requirements for the anchors has been waived.

All work will be paid for as Item 605012-001, Adjust Inlet Type C, per each.

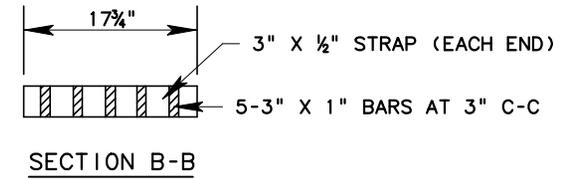
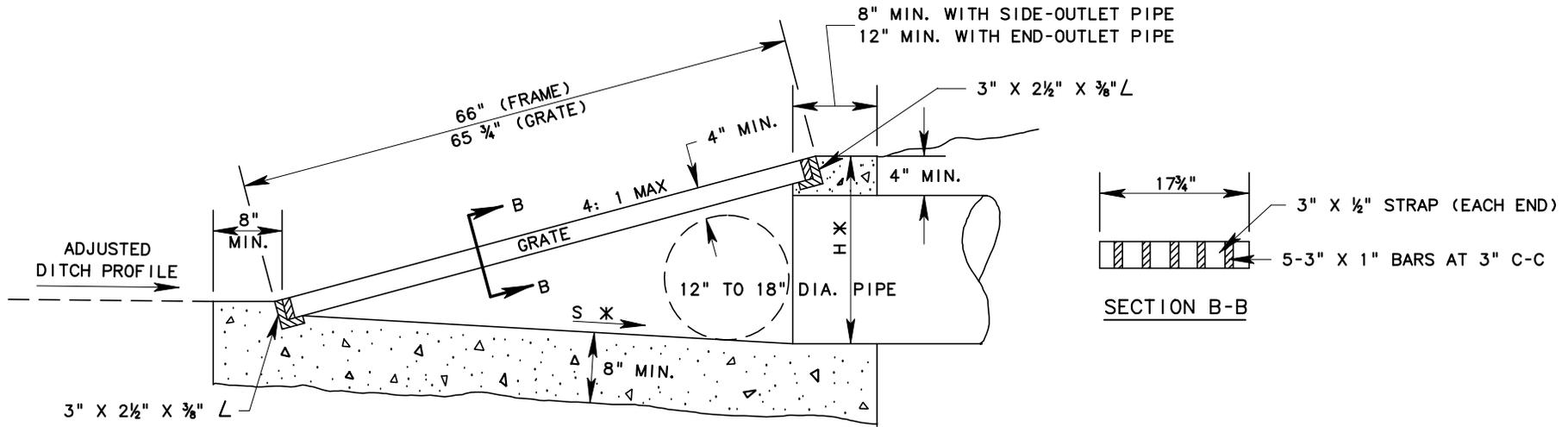


ANCHOR DETAIL

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**ADJUSTING TYPE C INLETS (SLOPE)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



X SLOPE & HEIGHT VARIES TO ACCOMIDATE PIPE DIAMETER.

SECTION A-A

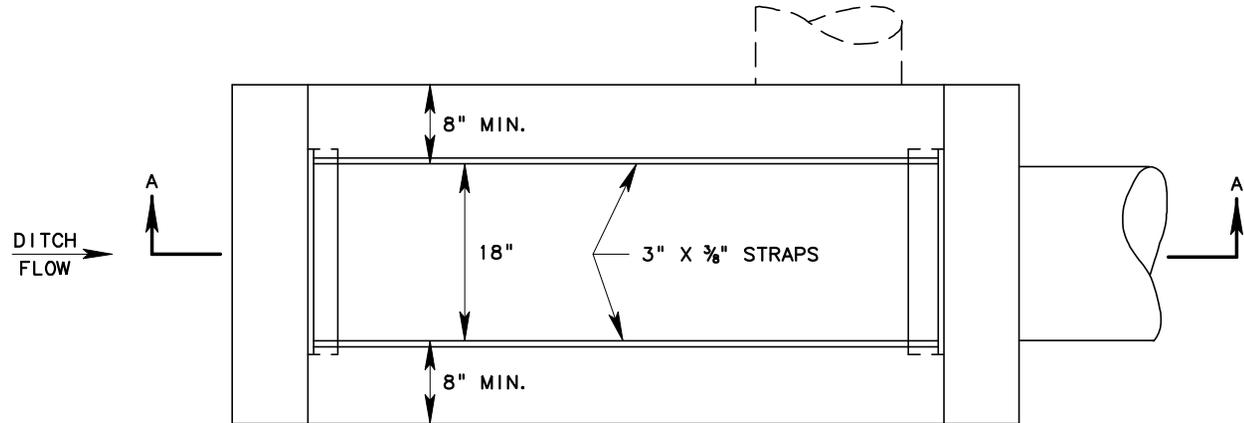
NOTES :

Grate and frame to be fabricated as per Type G Inlet Standard Detail. 2 3/4" x 1" bars and 2 3/4" x 7/8" straps may be substituted for the bars and straps as shown hereon.

Concrete for constructing the inlet shall have mix proportions in accordance with Section 605 of the Specifications; however, testing will not be required.

All work, including pipe extension if called for on the plans, is to be included in the cost of inlet.

Item 605051-001, Type U Inlet, per each.

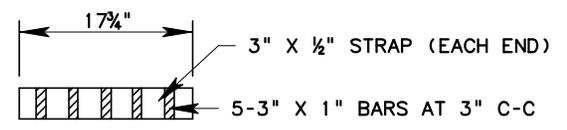
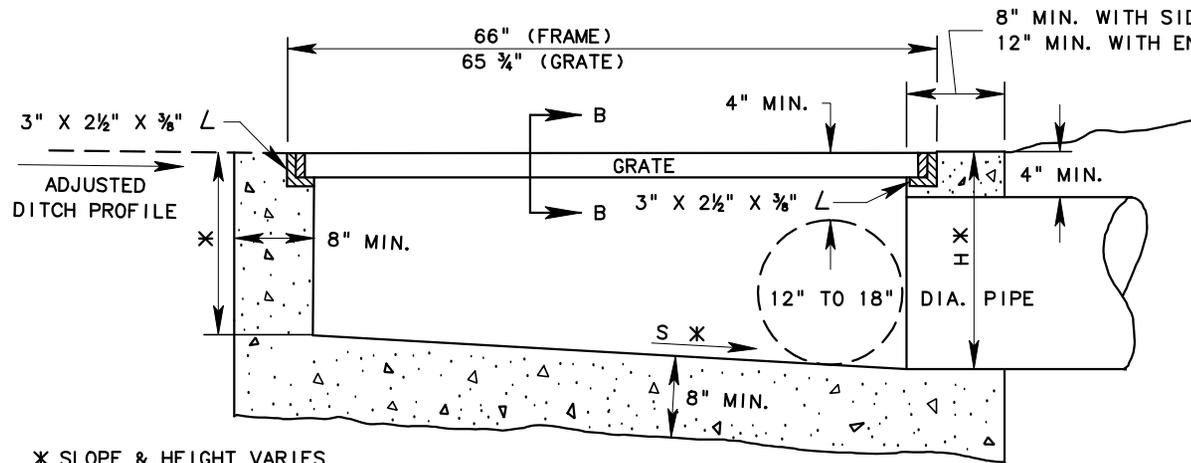


PLAN (GRATE NOT SHOWN)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

TYPE U INLET ( 1 OF 2 )

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



\* SLOPE & HEIGHT VARIES TO ACCOMMODATE PIPE DIAMETER.

SECTION A-A

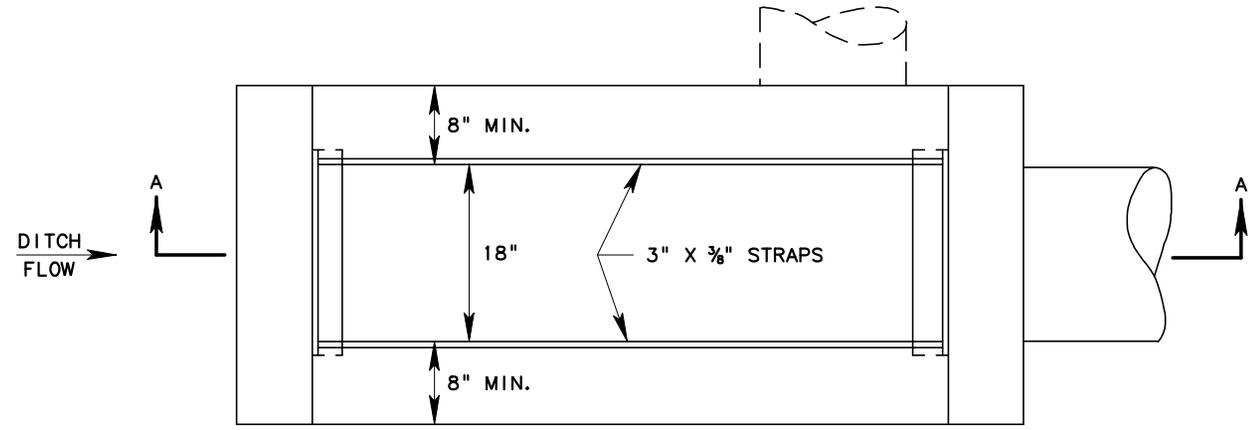
NOTES :

Grate and frame to be fabricated as per Type G Inlet Standard Detail. 2 3/4" x 1" bars and 2 3/4" x 7/8" straps may be substituted for the bars and straps as shown hereon.

Concrete for constructing the inlet shall have mix proportions in accordance with Section 605 of the Specifications; however, testing will not be required.

All work, including pipe extension if called for on the plans, is to be included in the cost of inlet.

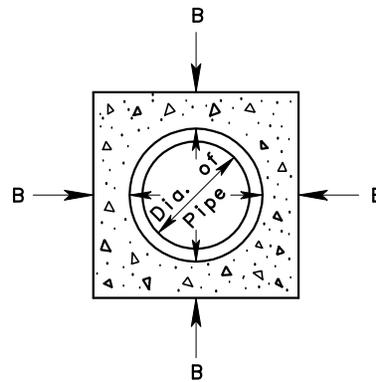
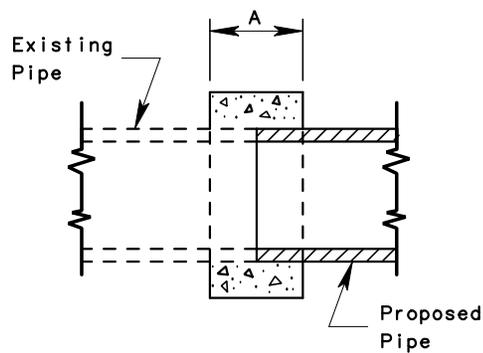
Item 605051-001, Type U Inlet, per each.



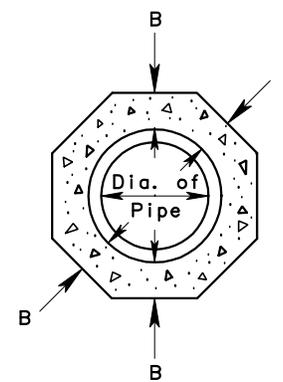
PLAN  
(GRATE NOT SHOWN)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS  
SPECIAL TYPE U INLET (2 OF 2)

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



48" AND UNDER



OVER 48"

NOTES :

A and B are minimum dimensions. Forming will not be required if minimum dimensions are obtained. Metal connecting bands may be substituted for a concrete collar to join existing and new metal pipes. The cost of metal bands are to be included in the unit bid price for the various pipes.

Concrete for constructing the collar shall be in accordance with Section 715.12 of the Specifications; however, testing will not be required. The cost of concrete collar is to be included in the unit bid price of proposed pipe.

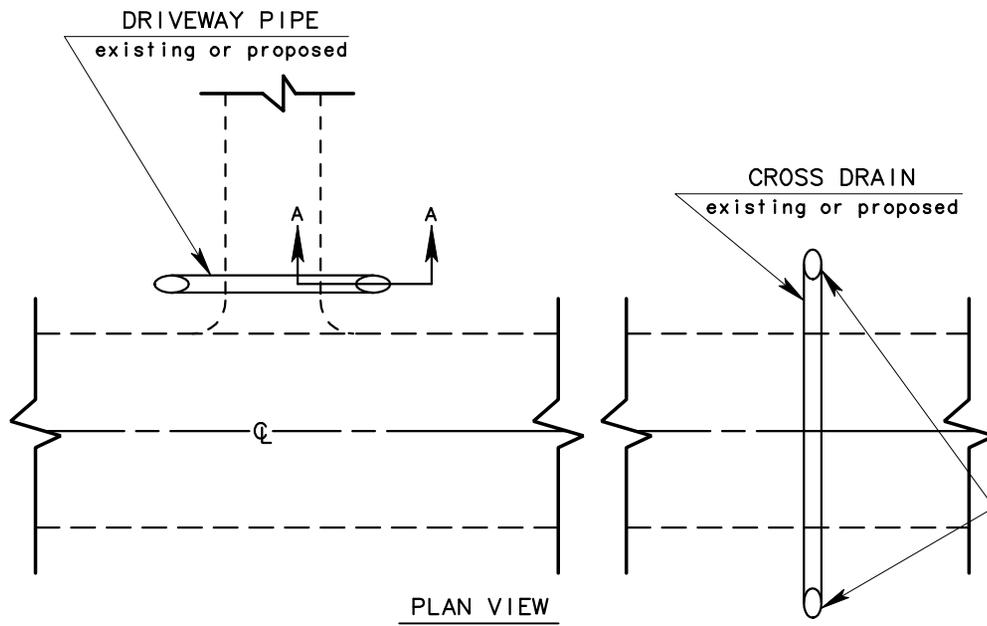
DIAMETER OF PIPE	A	B	CU. YD. CONC. *	DIAMETER OF PIPE	A	B	CU. YD. CONC. *
15"	1'-0"	0'-6"	0.18	48"	2'-0"	1'-0"	2.10
18"	1'-0"	0'-6"	0.21	54"	2'-6"	1'-0"	2.09
21"	1'-0"	0'-6"	0.24	60"	3'-0"	1'-6"	4.31
24"	1'-0"	0'-6"	0.27	72"	3'-0"	1'-6"	5.03
30"	1'-6"	0'-9"	0.75	84"	3'-0"	2'-0"	7.94
36"	1'-6"	0'-9"	0.92	96"	3'-0"	2'-0"	8.90
42"	2'-0"	1'-0"	1.84	108"	3'-0"	2'-0"	9.87

\* FOR INFORMATION ONLY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**CONCRETE COLLAR DETAIL**

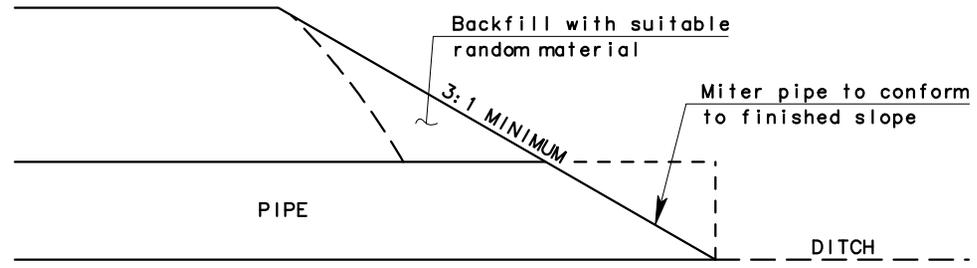
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



PLAN VIEW

**NOTES :**  
 This detail will only apply to the locations designated on the plans. The cost of mitering, site grading, and any fill material required for existing pipe modifications is to be incidental to the various unit bid prices of this project. The cost of mitering site grading new pipe installations is to be included in the unit bid price of the new pipe.

Miter pipe and site grade to conform to adjacent slope



SECTION A-A

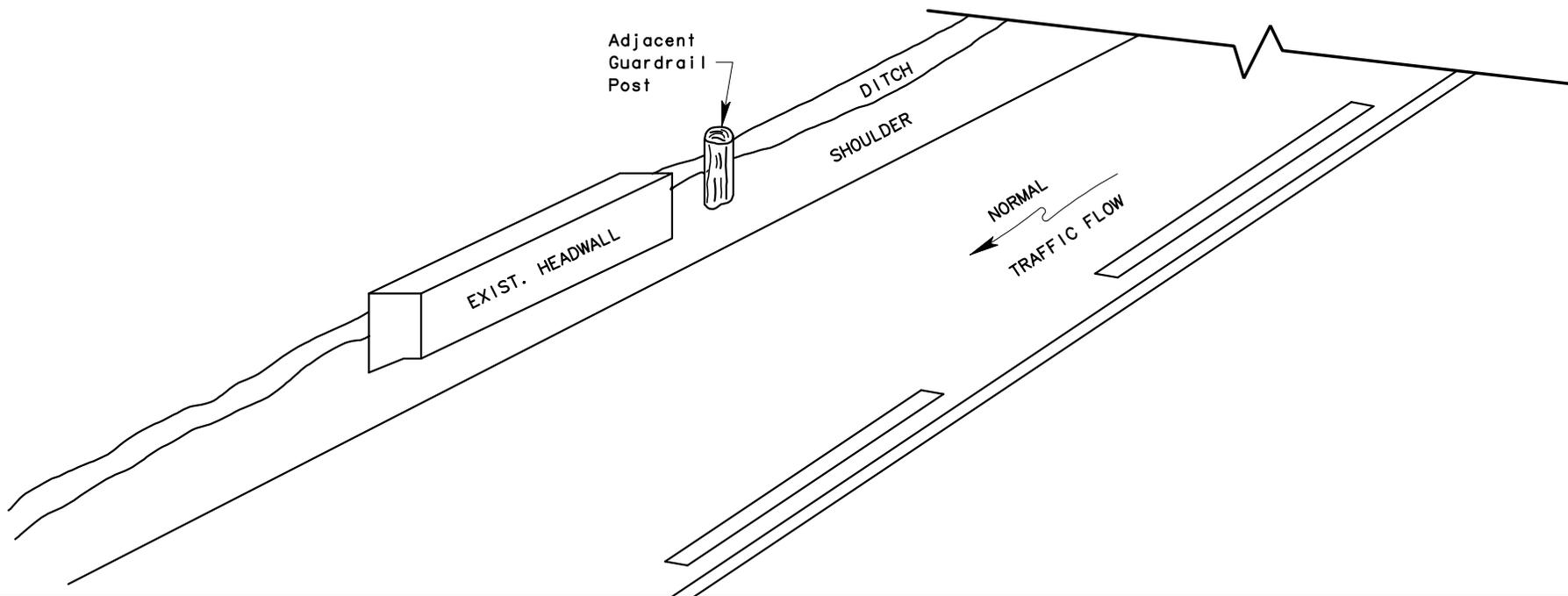
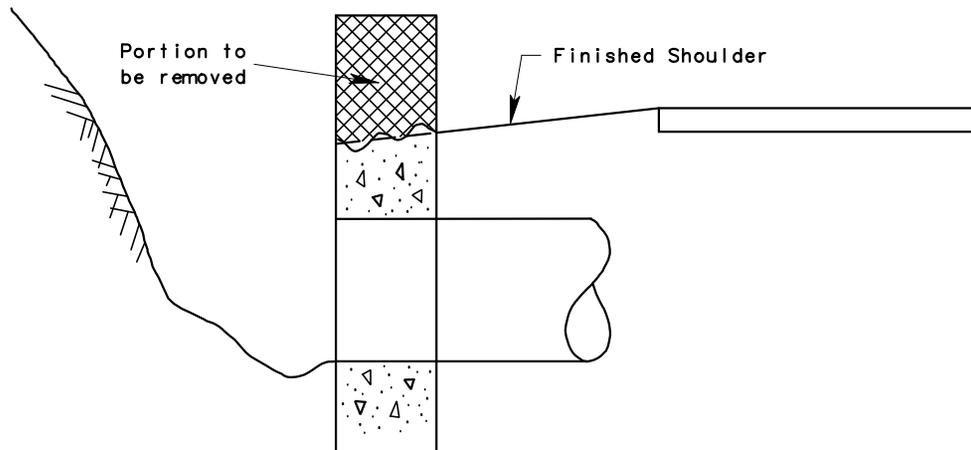
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PIPE MITER DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

The intent of this operation is to eliminate roadside hazards formed by concrete headwalls above the finished shoulder elevation on roads where operating speeds are expected to exceed 25mph. The headwalls, as listed in the table, are to be adjusted by removal of the top concrete by jackhammering or by other suitable methods as approved by the Engineer to achieve a top surface free of hazardous sharp edges and to avoid damages to the remaining headwall. Any adjacent guardrail posts which are used only as a hazard warning device are to be removed as a part of this operation.

Payment for this work is to be Item 605050-001 Adjusting Concrete Headwall, per each.



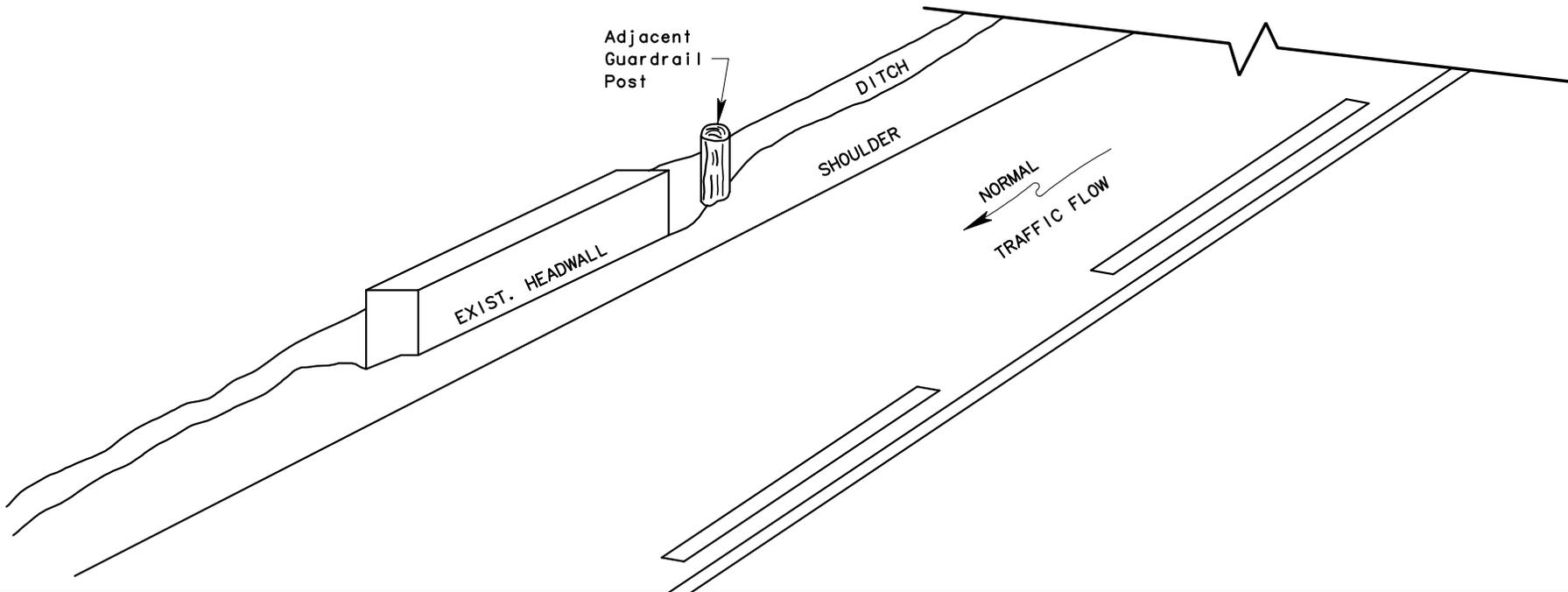
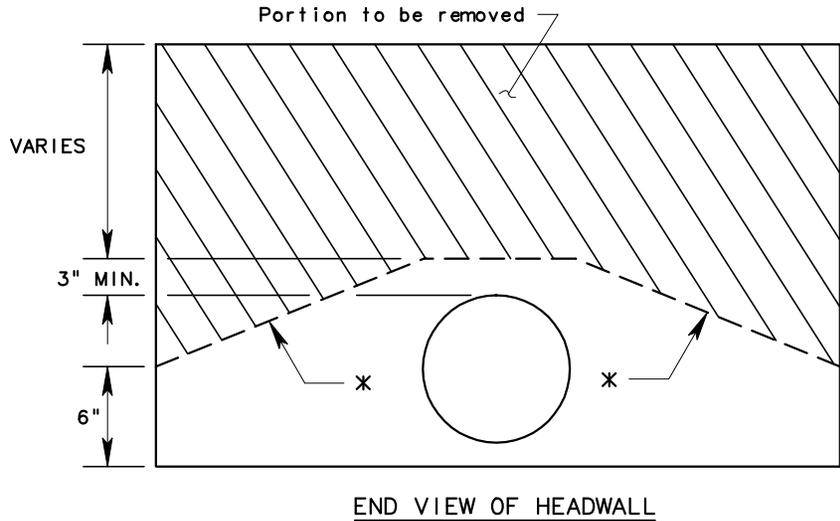
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS  
**ADJUSTING CONCRETE HEADWALLS**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

The intent of this operation is to eliminate roadside hazards formed by concrete headwalls above the finished shoulder elevation on roads where operating speeds are expected to exceed 25mph. The headwalls, as listed in the table, are to be adjusted by removal of the top concrete by jackhammering or by other suitable methods as approved by the Engineer to achieve a top surface free of hazardous sharp edges and to avoid damages to the remaining headwall. Any adjacent guardrail posts which are used only as a hazard warning device are to be removed as a part of this operation.

Payment for this work is to be Item 605050-001 Adjusting Concrete Headwall, per each.

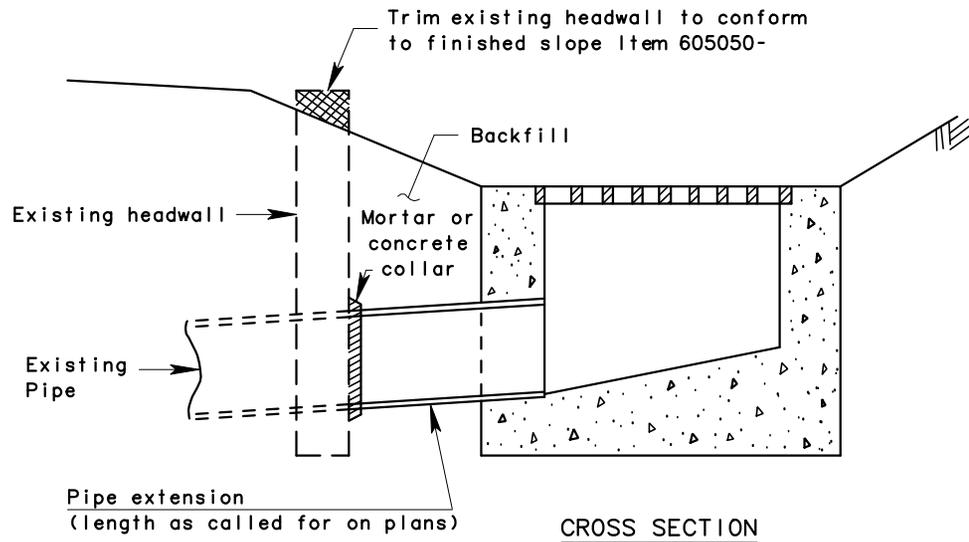
X LINE OF REMOVAL TO MATCH EXISTING SLOPE INTERSECTION.



THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## ADJUSTING CONCRETE HEADWALLS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



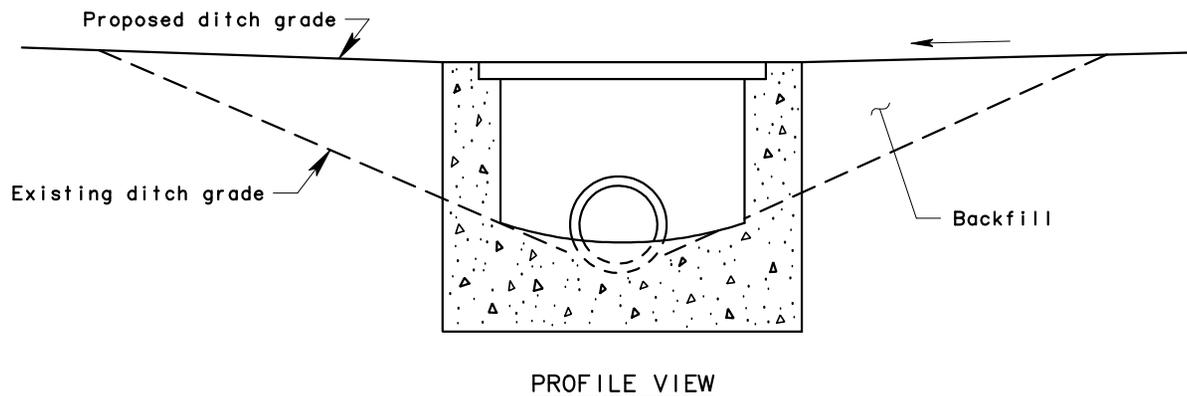
**NOTES:**

See Standard DR6-G for inlet details.

Fill area around inlet with suitable random material. Fill is to be placed in 6" loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

The cost of backfill material and reshaping existing ditch to new grade is to be included in the unit price bid for Item 605009-001, Type G Inlet, per each.

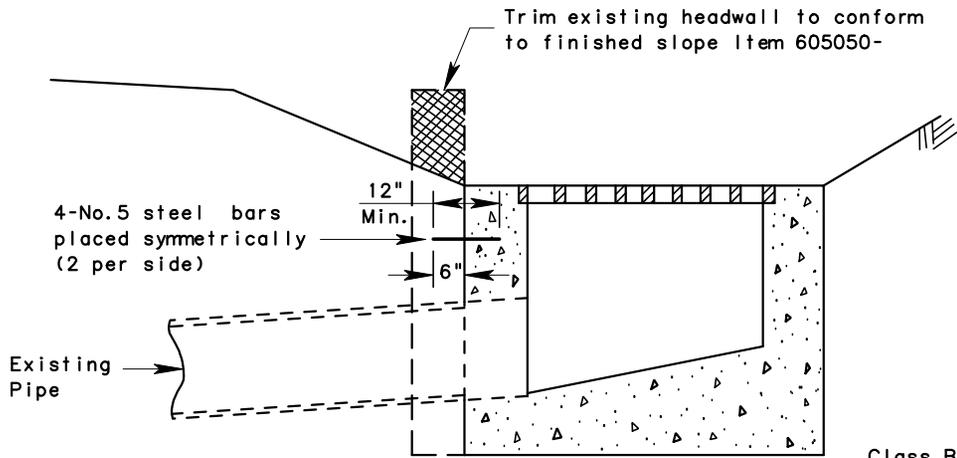
The pipe extension, as called for on the plans, shall be in accordance with Section 604 of the Specifications. Testing of the material will not be required, however; the Contractor will be required to provide certification that the materials meet Section 604 of the Specifications. Testing of mortar will not be required.



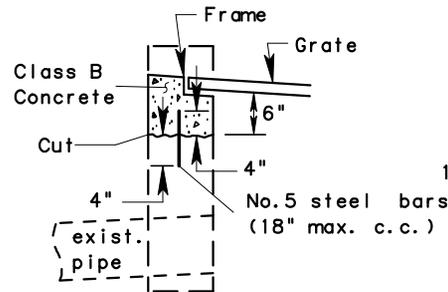
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**TYPE G INLET PLACEMENT**

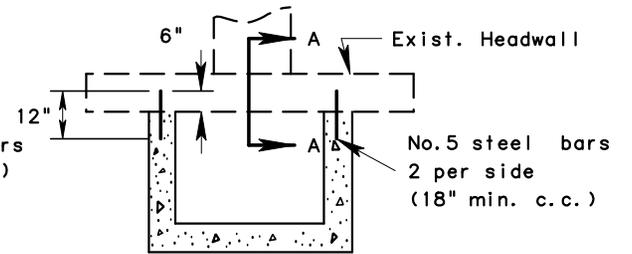
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



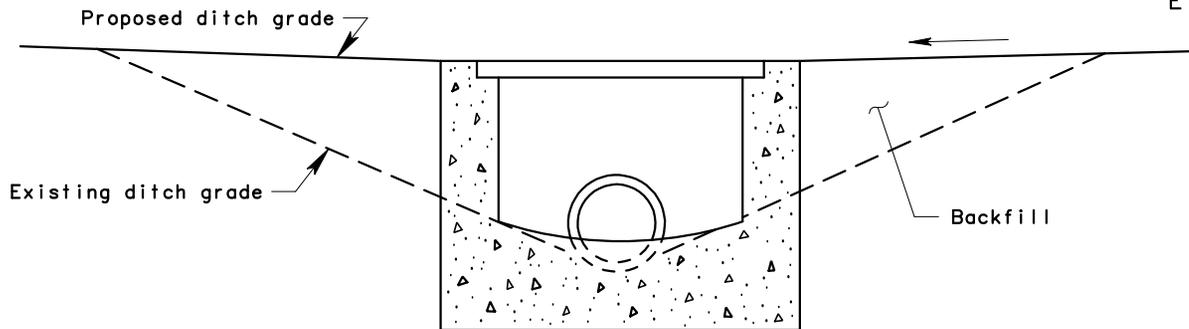
CROSS SECTION



SECTION A-A



OPTIONAL CONSTRUCTION  
Elimination of Inlet Wall



PROFILE VIEW

**NOTES:**

See Standard DR6-G for inlet details.

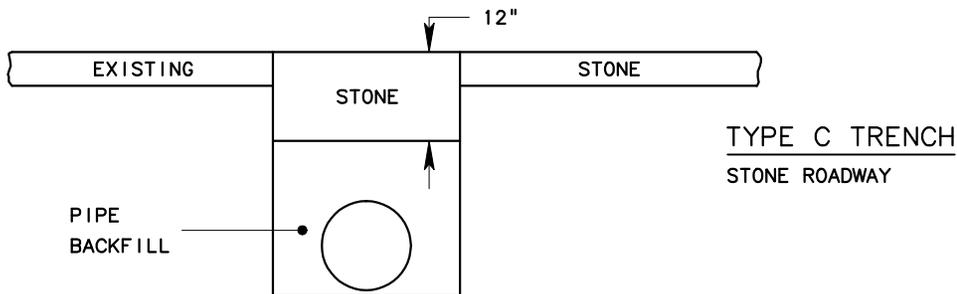
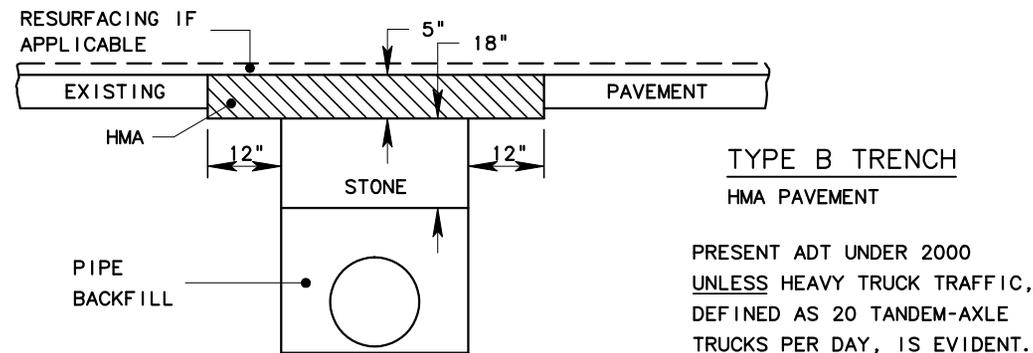
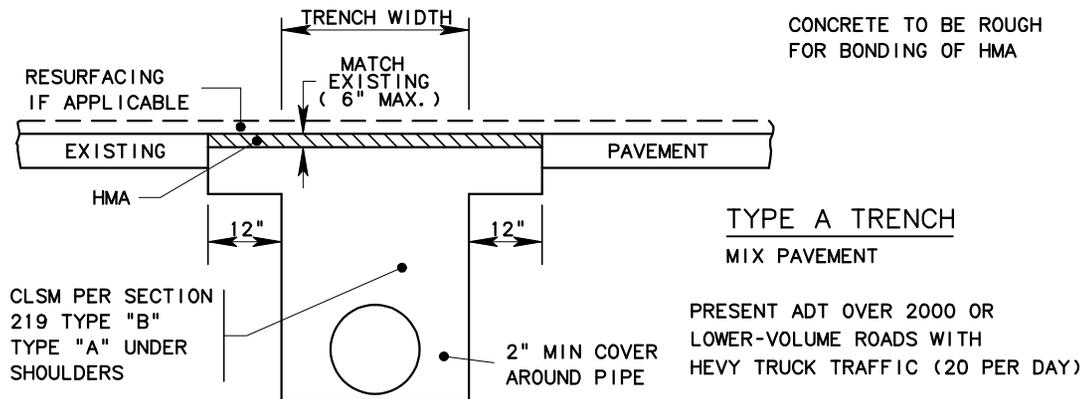
Fill area around inlet with suitable random material. Fill is to be placed in 6" loose lifts and compacted a minimum of four passes per lift with a mechanical tamper. Testing of compaction is not required.

The cost of backfill material and reshaping existing ditch to new grade is to be included in the unit price bid for Item 605009-001, Type G Inlet, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**TYPE G INLET PLACEMENT**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



NOTES:

- Types A, B, and C trenches to be used as applicable whether or not specified in the plans.
- HMA thickness shown here are in addition to any resurfacing which may be included in this project. Trench to be completed before resurfacing.
- Type of stone to be same as specified for base on this project and payment to be in tons or C.Y. as specified in those items. If such stone is not specified, cost is to be included in the unit price of pipe and stone to meet requirements of section 307 class 1.
- Payment for HMA to be in tons of material specified for the project. If such items are not specified cost is to be included in unit price of pipe. HMA base or patching and leveling may be used.
- Cost of all labor, materials, and equipment to complete the work to the surface of the existing pavement in accordance with the applicable detail(s) shall be included in the unit price for the pipe.
- Where type A trenches are wider than 7' in existing bituminous pavement, concrete may be deleted if existing HMA thickness and 18" stone are restored.
- Traffic is to be maintained at all times by the use of appropriate traffic control devices. Use of metal plates, having sufficient rigidity to span Type A trench, is required to prevent wheel loads from being transmitted to the CLSM. The plates are to be securely anchored to prevent movement caused by traffic. The plates are to be left in place until the CLSM has attained a 50% of its compressive strength. Cost of such plates is to be included in the unit price bid for pipe.

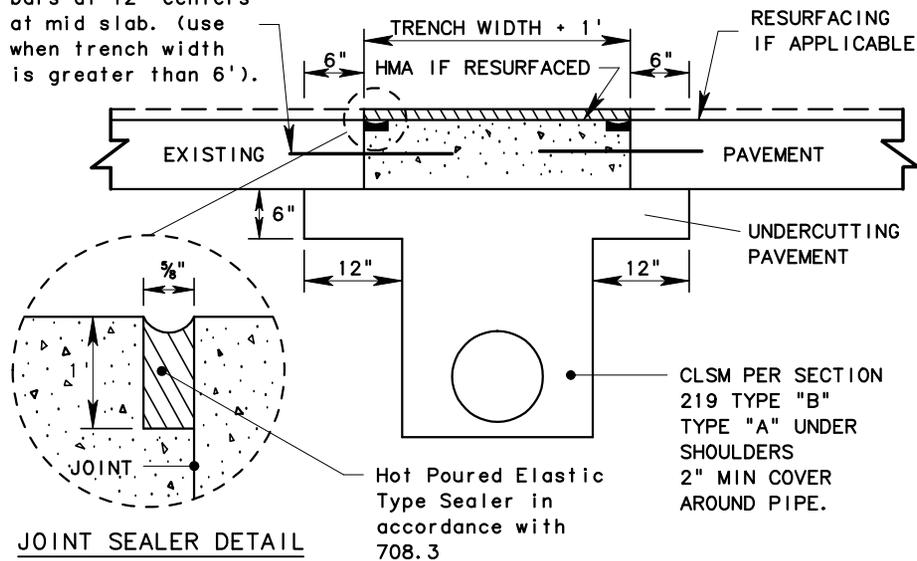
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

REPAVING PIPE TRENCHES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

**TYPE D TRENCH  
CONCRETE PAVEMENT**

1 1/4" x 18" Dowel bars at 12" centers at mid slab. (use when trench width is greater than 6').



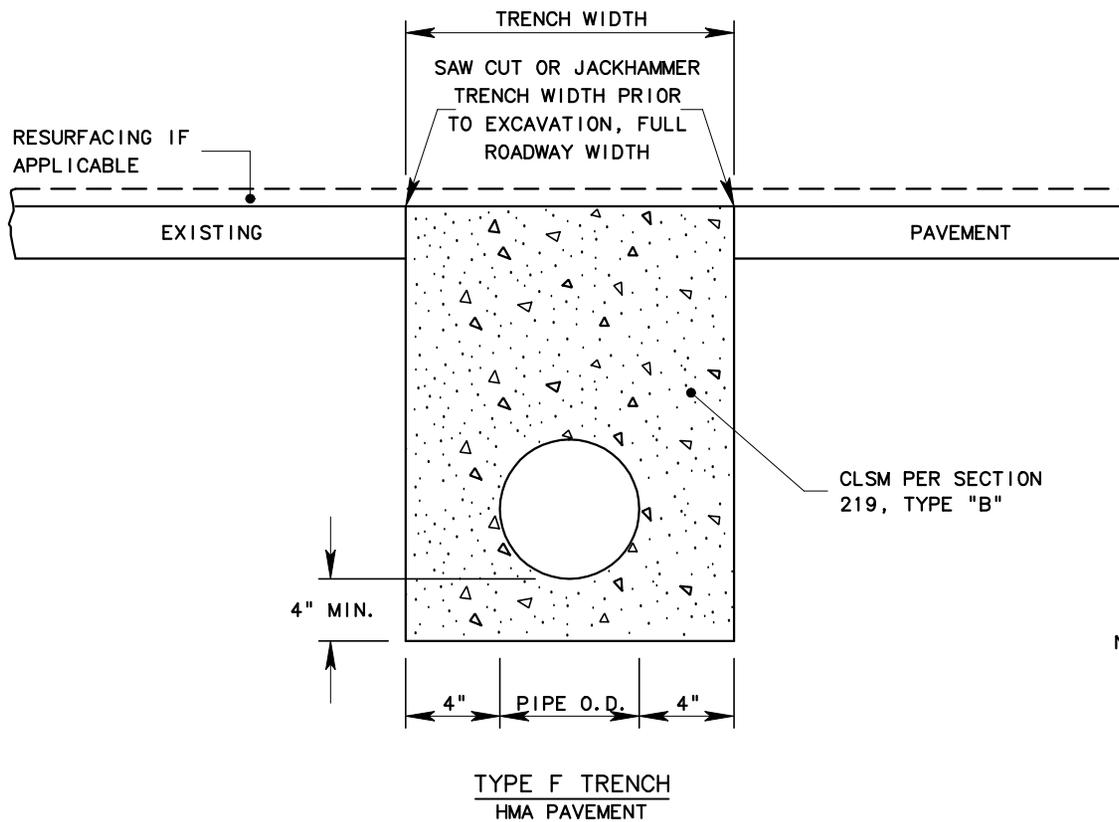
**NOTES:**

1. Type D trenches to be used as applicable whether or not specified in the plans.
2. Concrete surface to be rough for bonding of HMA if area to be resurfaced. Trench to be completed before resurfacing.
3. Payment for HMA to be in tons of material specified for the project. if such items are not specified cost is to be included in unit price of pipe. H.L.B.C base or patching and leveling may be used.
4. Cost of all labor, materials, and equipment to complete the work to the surface of the existing pavement in accordance with the applicable detail(s) shall be included in the unit price for the pipe.
5. Testing of steel bars and dowels is waived; however the Engineer must verify dimensions.
6. Traffic is to be maintained at all times by the use of appropriate traffic control devices. Use of metal plates, having sufficient rigidity to span Type D trenches, is required to prevent wheel loads from being transmitted to the concrete. The plates are to be securely anchored to prevent movement caused by traffic. The plates are to be left in place until the concrete has attained a compressive strength. Cost of such plates is to be included in the unit price bid for pipe.
7. Concrete shall be constructed in accordance with Section 501 except that testing is waived if from a Certified Supplier.
8. Dowel bars are to be coated in accordance with Section 709.15 of the Specifications.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**REPAVING PIPE TRENCHES**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



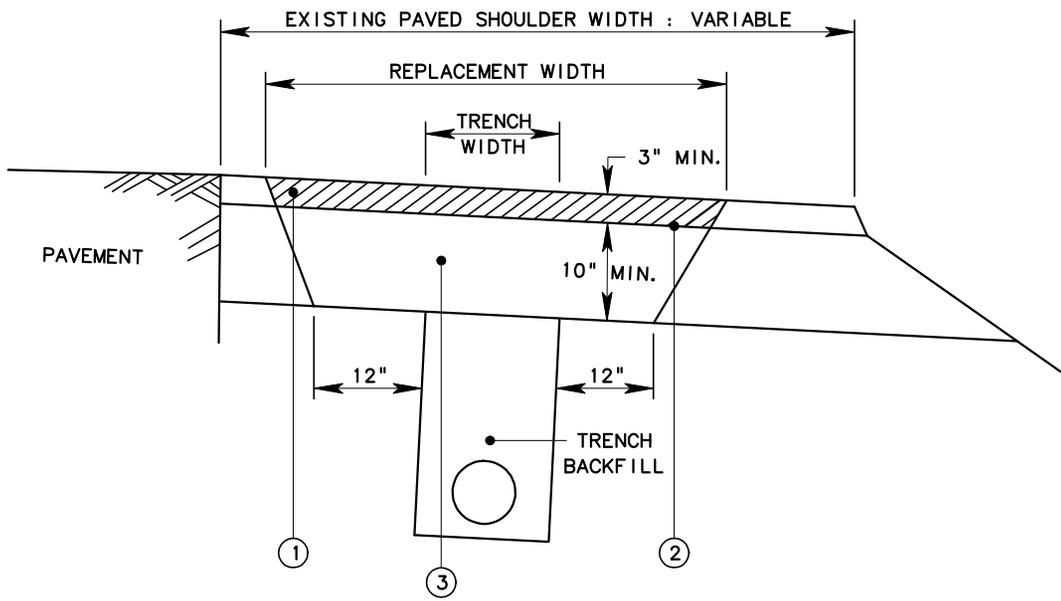
WHEN NO OVERLAY IS SPECIFIED THE CONTROLLED LOW-STRENGTH MATERIAL (CLSM) SHALL BE A MIN. OF 2000 psi FOR DOH PIPES ONLY. NOT TO BE USED FOR UTILITY PIPES.

NOTE: IF TYPE F TRENCH IS USED WHERE THERE IS NO EXISTING OR PROPOSED INLET, THE CLSM SHALL BE POURED FULL DEPTH 2' PAST EACH E.P. THE PIPE SHALL BE ENCASED IN 4" OF CLSM AN ADDITIONAL 10' MAX. BEYOND E.P. IF THERE IS AN EXISTING OR PROPOSED INLET THE CLSM SHALL BE POURED FULL DEPTH TO THE INLET.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# REPAVING PIPE TRENCHES IN PAVED SHOULDER

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



**NOTES:**

HMA and Class I Aggregate shall be placed to thicknesses equal to existing shoulder thicknesses or to the minimums as shown, which ever are greater.

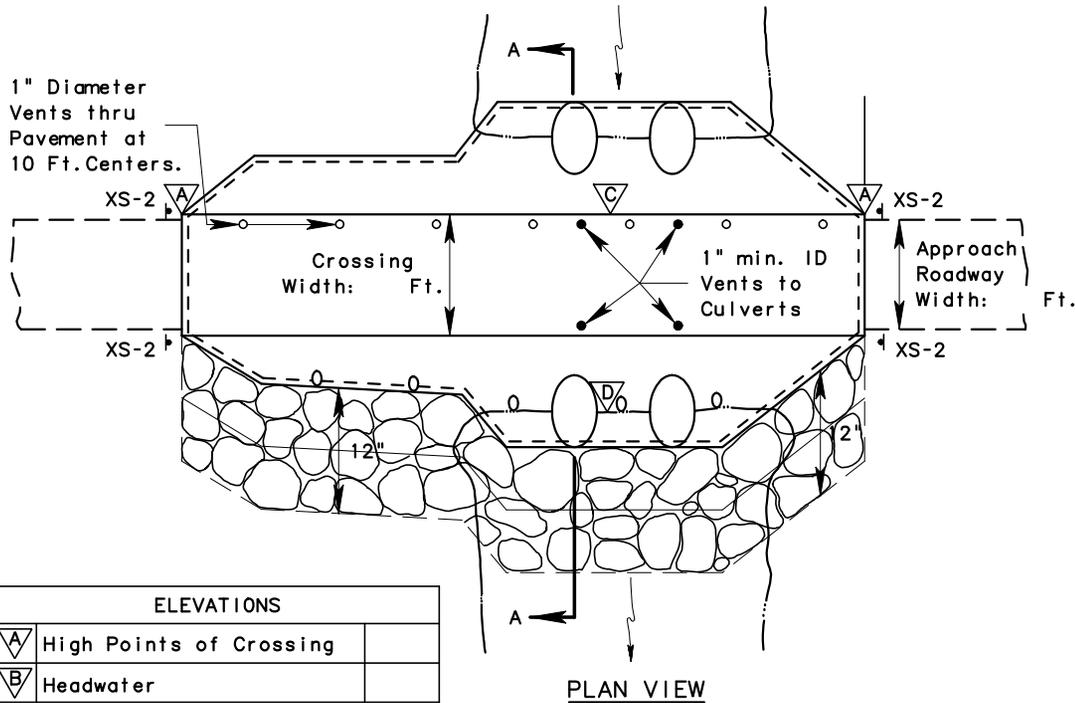
Trench shall be backfilled and compacted in accordance with 670.4.5 of the Specifications.

- ① ITEM 401001- , HOT-MIX ASPHALT BASE COURSE, TYPE
- ② ITEM 408002-001, BITUMINOUS MATERIAL, 0.03 GAL. PER S. Y.
- ③ ITEM 307001- , AGGREGATE BASE COURSE, CLASS

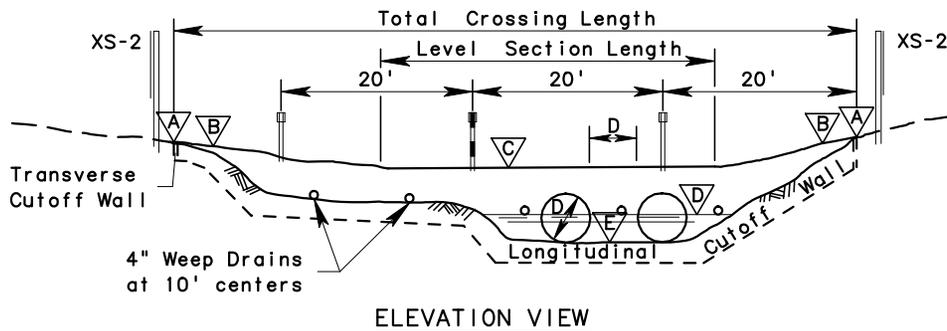
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# REPAVING PIPE TRENCHES IN PAVED SHOULDER

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



ELEVATIONS	
	High Points of Crossing
	Headwater
	Level Section
	Normal Daily Stream Flow
	Streambed (Downstream)



**WEEP DRAINS**

Weep drains are to be placed on downstream side only. Any type of pipe which will provide adequate forming of weep holes thru the wall may be used. Cost of pipe is to be included in various bid items.

**CULVERT PIPES**

Although these details indicate use of 2 culverts as typical situation, the crossing for this location requires pipe culvert(s); and sufficient quantities are included in the contract documents.

**INCIDENTAL ITEMS**

No separate payment for joint sealer, #5 bars, or vent pipes.

**HAZARD MARKERS & DELINEATORS**

XS-2 Hazard Markers as per Standard Sheet TP5-2 are to be installed at each corner of structure. U-Channel (2.00 \*/FT.) as per Standard Sheet TE1-7A shall be used for hazard marker supports and for mounting bidirectional 3/4" delineators at maximum 20' spacing each side of structure. Cost of all materials and labor for installation of hazard markers and delineators is to be included in the various bid items and no separate payment will be made. At least one post to be striped with black paint as shown in detail.

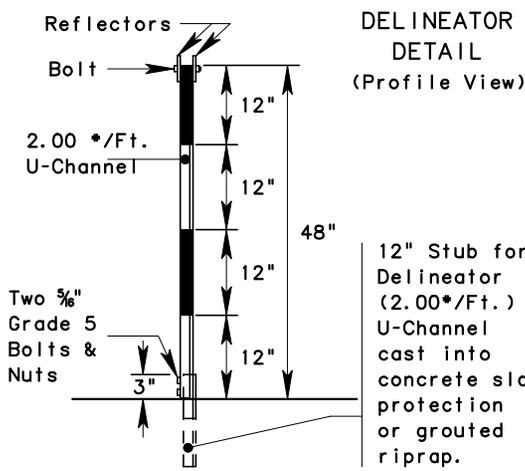
**VENT PIPES**

Vents may be commercially-available ABS, PVC, or PE.

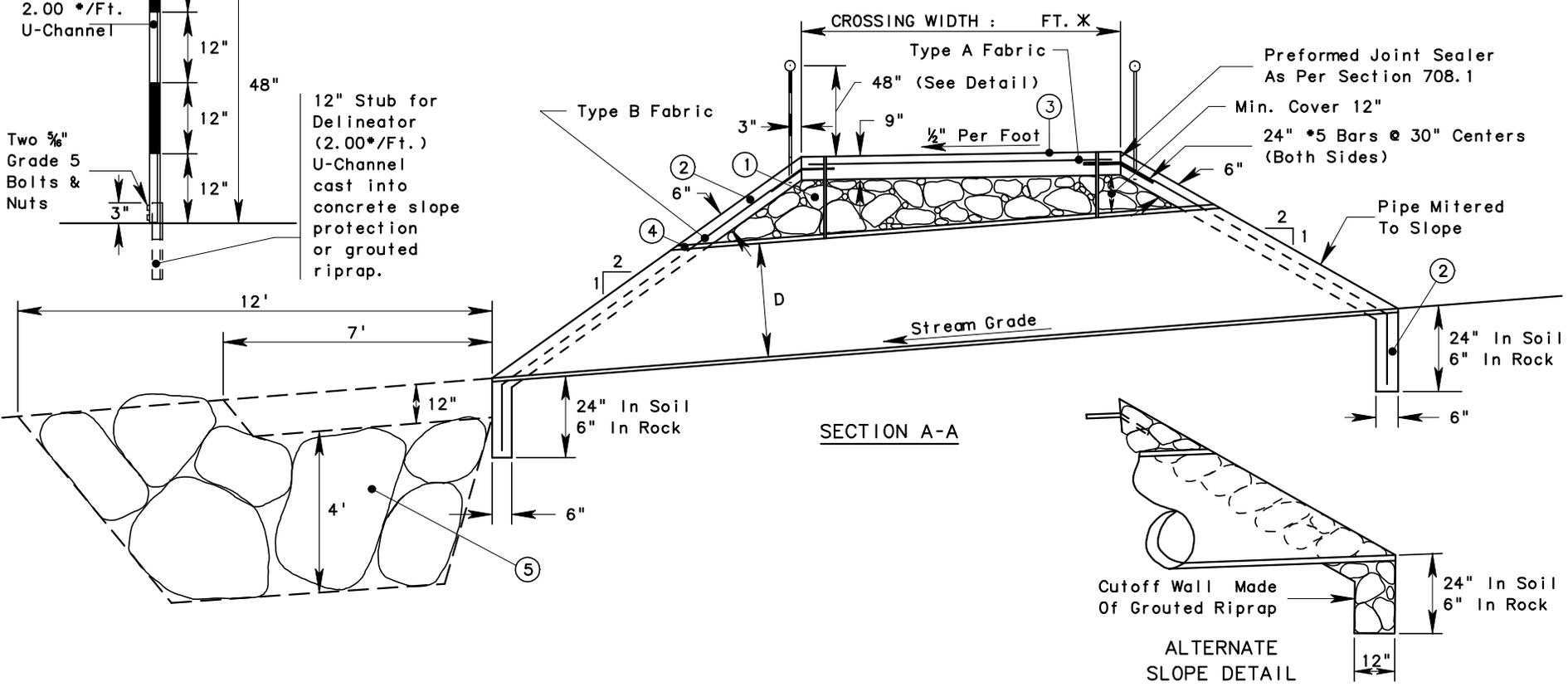
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**LOW - WATER CROSSING (1 OF 2)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



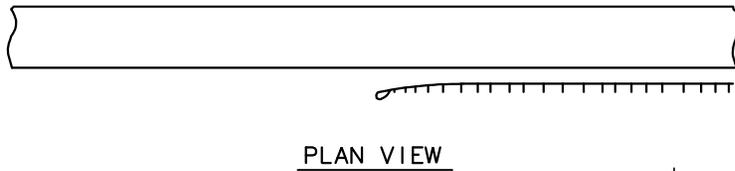
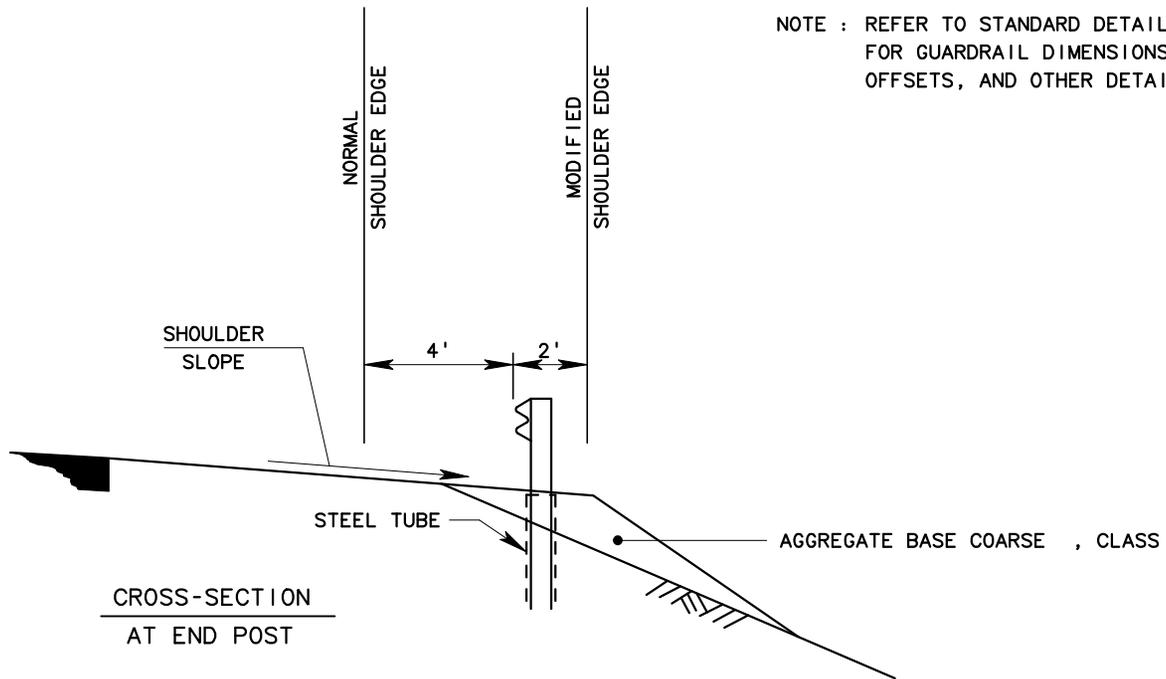
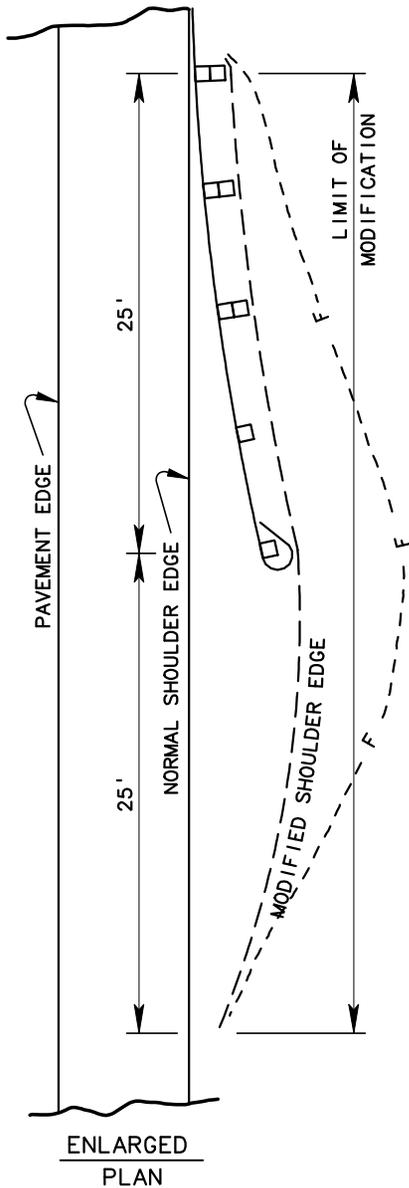
\* Minimum 12' Approach  
Roadway Width Plus 4'



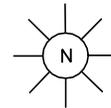
- ① Item 211008-000, Rock Borrow Excavation (Rock size maximum: 6" within 12" of pipe)
- ② Item 218005-000, Concrete Slope Protection (Item 218002-000, grouted riprap may be substituted as per alternate slope detail)
- ③ Item 501001-009, 9 Inch Reinforced Portland Cement Concrete Pavement
- ④ Item 604 - , Pipe,
- ⑤ Item 211008-000, Rock Borrow Excavation (Rock size minimum 18", maximum 48")  
(Not required where stream is on bedrock)

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS  
**LOW - WATER CROSSING (2 OF 2)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



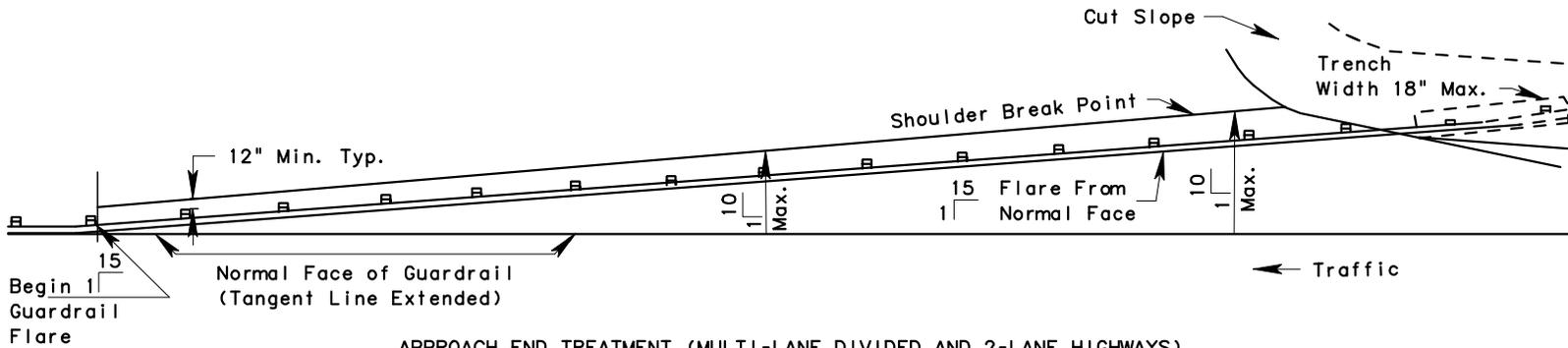
NOTE : REFER TO STANDARD DETAILS FOR GUARDRAIL DIMENSIONS, OFFSETS, AND OTHER DETAILS.



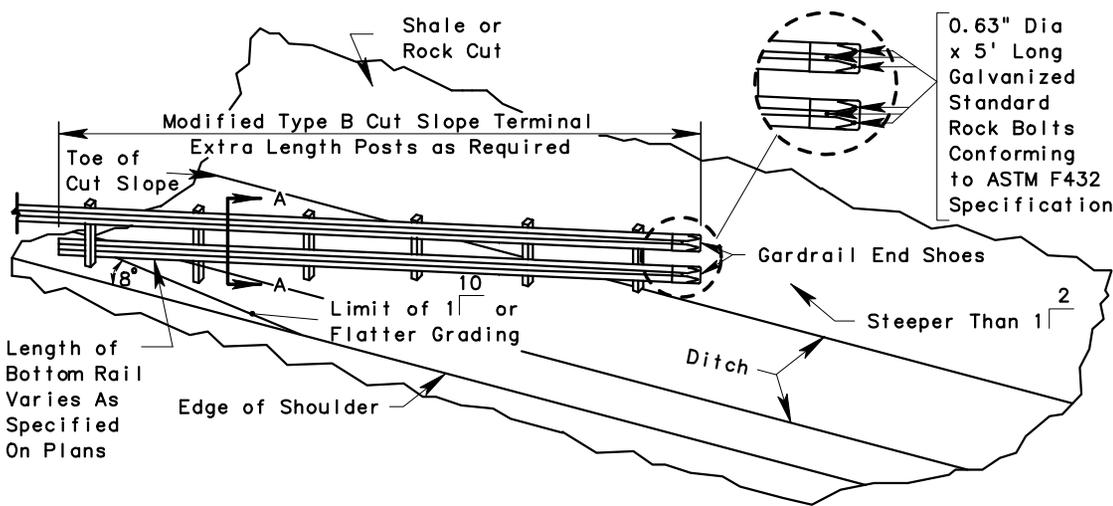
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# MODIFICATION OF SHOULDER FOR FET

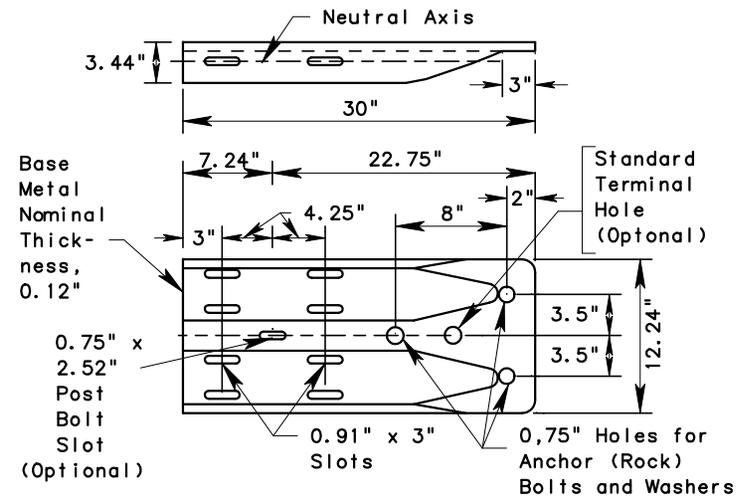
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



APPROACH END TREATMENT (MULTI-LANE DIVIDED AND 2-LANE HIGHWAYS)



MODIFIED TYPE B (SHALE OR ROCK) CUT SLOPE TERMINAL INSTALLATION

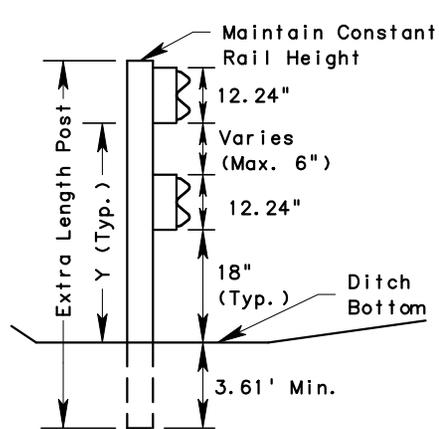


GUARDRAIL END SHOE DETAIL

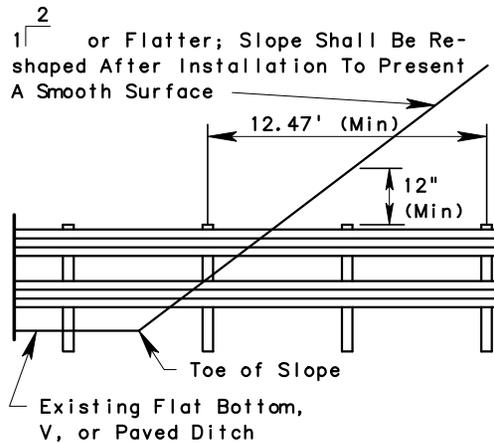
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# MODIFIED CUT SLOPE TERMINAL (1 OF 2)

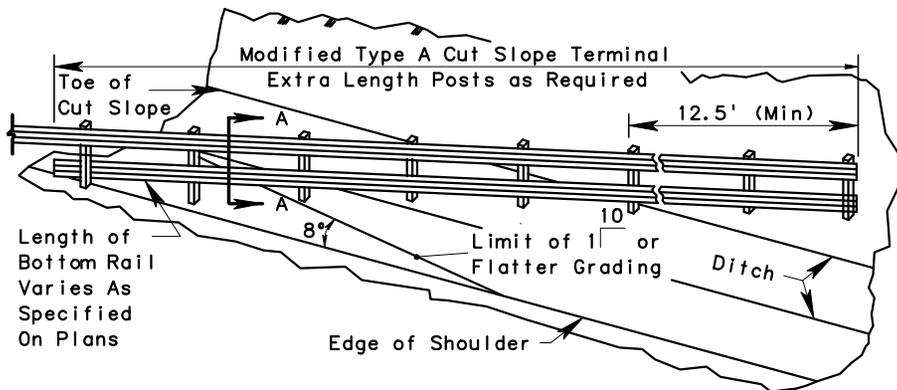
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



Discontinue Bottom Rail When  $Y \leq 18"$   
Section A - A



END VIEW (TYPE A CUT SLOPE TERMINAL)



MODIFIED TYPE A (SOFT SHALE OR SOIL) CUT SLOPE TERMINAL INSTALLATION

**NOTES**

THIS DETAIL IS APPLICABLE WHERE A CUT SLOPE TERMINAL IS DESIRED, BUT ADDITIONAL GRADING OR PLACEMENT OF MATERIAL INTO THE ROADWAY DITCH IS NOT DESIRED. THE TOP OF THE GUARDRAIL RELATIVE TO THE ELEVATION OF THE EDGE OF PAVEMENT MUST REMAIN CONSTANT.

MODIFIED TYPE A (SOFT SHALE OR SOIL) CUT SLOPE TERMINAL GUARDRAIL SHALL BE THAT GUARDRAIL WHICH (1) IS TO EXTEND A MINIMUM OF TWO 75" SPANS INTO THE CUT SLOPE, FROM THE FIRST POST BEYOND THE TOE OF THE CUT SLOPE, AS DETAILED HEREIN, AND (2) IS TO TERMINATE A MINIMUM OF 12" BELOW THE GROUND ELEVATION OF THE BACK SLOPE, AS DETAILED HEREIN, EXCEPT IN AREAS OF HEAVY ROCK OUTCROPPING WHERE THE MINIMUM DEPTH MAY BE 6".

MODIFIED TYPE B (SHALE OR ROCK) CUT SLOPE TERMINAL INSTALLATION SHALL CONSIST OF ANCHORING THE GUARDRAIL AGAINST THE FACE OF THE CUT SLOPE UTILIZING GUARDRAIL END SHOES AND ROCK BOLTS, AS DETAILED HEREIN.

POSTS, BLOCKS, AND RAIL ELEMENTS SHALL BE THE SAME TYPES USED IN THE NORMAL GUARDRAIL INSTALLATION, EXCEPT FOR THE ADDITIONAL LENGTH POSTS WHOSE LENGTH WILL BE DETERMINED IN THE FIELD. THESE POSTS ARE TO BE MODIFIED TO ACCEPT THE ADDITIONAL GUARDRAIL SECTION. UNDERGROUND POSTS MAY BE W6" x 8.5" IN LENGTH, IN AREAS OF HEAVY ROCK OUTCROPPING. GUARDRAIL BLOCKS SHALL NOT BE USED ON ANY POSTS COMPLETELY UNDERGROUND.

A TRENCH NO GREATER THAN 17.22" IN WIDTH SHALL BE EXCAVATED INTO THE CUT SLOPE TO ACCOMMODATE THE MODIFIED TYPE A TERMINAL INSTALLATION. THE CONTRACTOR SHALL SO ARRANGE HIS WORK SEQUENCE TO PROVIDE THAT EACH MODIFIED TYPE A CUT SLOPE TERMINAL INSTALLATION SHALL BE EXCAVATED, POSTS DRIVEN, RAIL ELEMENTS AND GUARDRAIL COMPONENTS ASSEMBLED, THE TRENCH BACKFILLED, AND DISTURBED SLOPE SHAPED, SEEDED AND MULCHED, ALL IN ONE CONTINUOUS OPERATION.

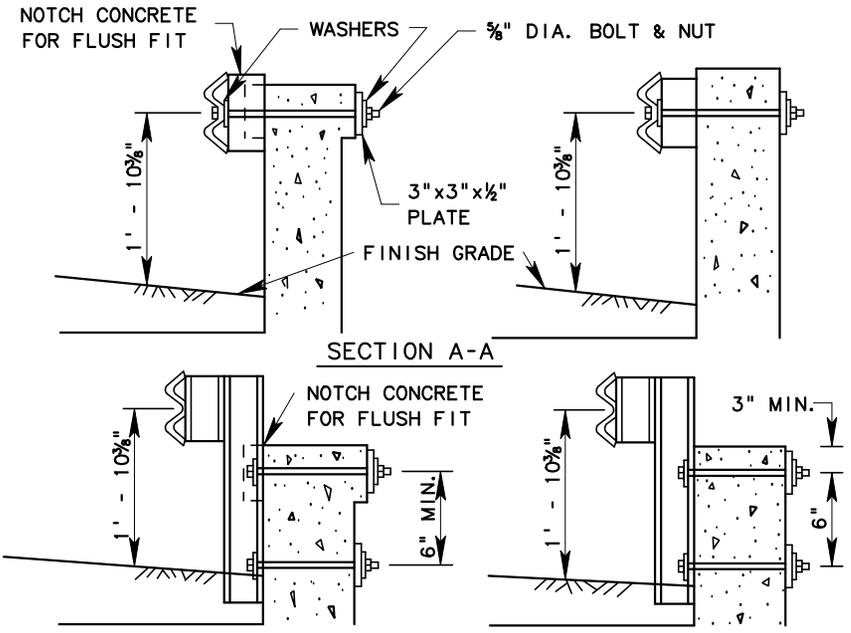
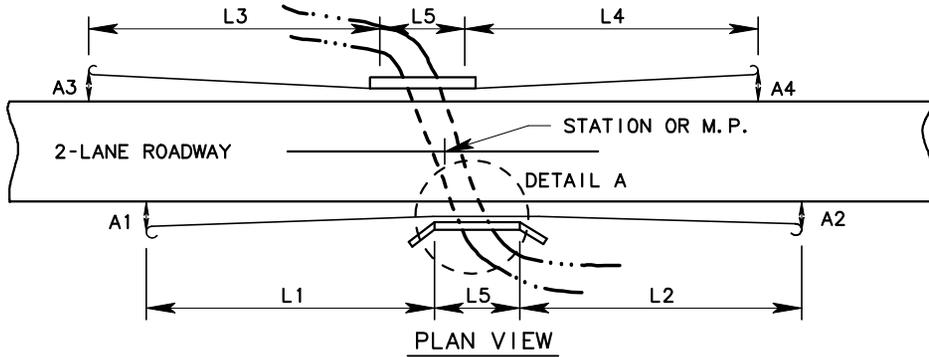
THE COST OF FURNISHING AND INSTALLING MODIFIED CUT SLOPE TERMINAL (A OR B) SHALL INCLUDE EXCAVATING, BACKFILLING, RESHAPING, SEEDING AND MULCHING THE TRENCH, ADDITIONAL LENGTH GUARDRAIL POSTS AS REQUIRED, DRILLING HOLES INTO THE CUT SLOPE, FURNISHING AND INSTALLING ROCK BOLTS, END SHOES AND HARDWARE FOR BOTH THE UPPER AND LOWER GUARDRAIL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 607025-001, "CUT SLOPE TERMINAL, TYPE A OR B MODIFIED" PER EACH.

NORMAL GUARDRAIL COMPONENTS: I.E. POSTS, BLOCKS, RAIL ELEMENTS, HARDWARE, ECT. SHALL BE PAID FOR AS GUARDRAIL PER FOOT.

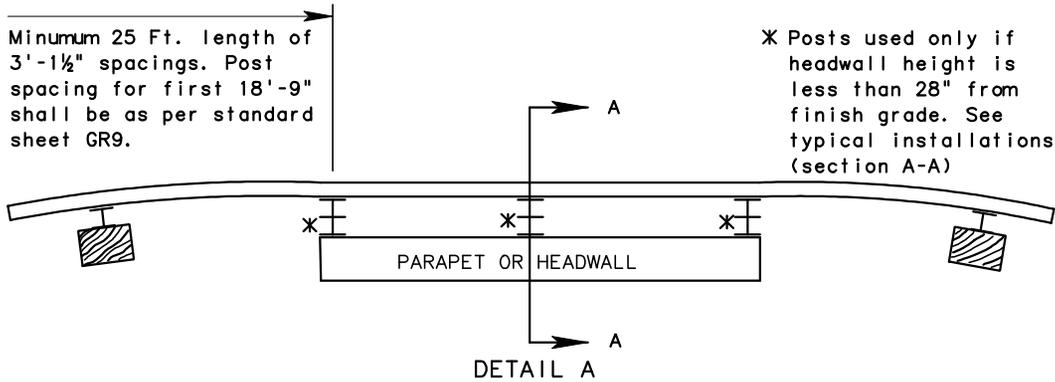
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**MODIFIED CUT SLOPE TERMINAL (2 OF 2)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.



GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2			

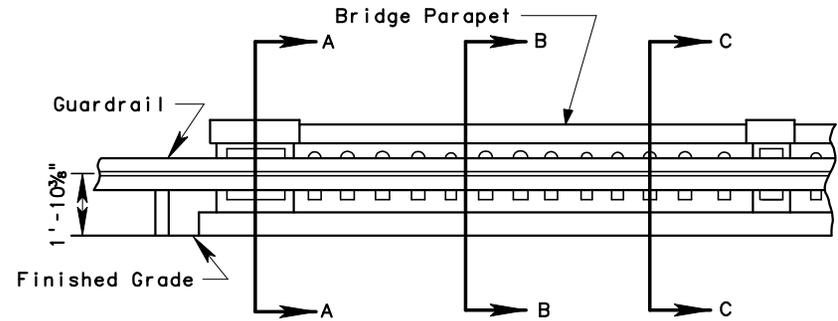
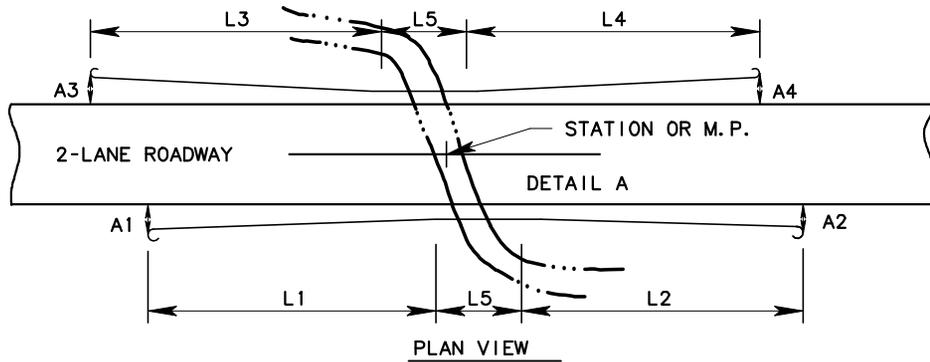
Guardrail to be attached at each end of headwall or parapet and at a maximum of 3'-1 1/2" spacings along the entire length. All bolts, nuts, washers, and plates to be galvanized and meet strength requirements of similar items as depicted in the standards. Cost of all necessary hardware and installation procedures such as notching and drilling concrete included in the unit price bid for guardrail. Refer to guardrail standards.

Refer to special details for attaching guardrail to parapet if guardrail is not continued across structure.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

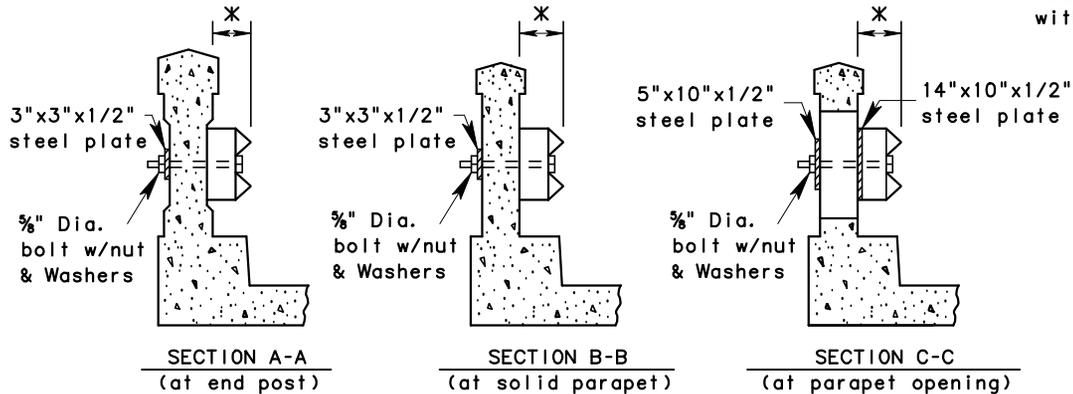
# GUARDRAIL INSTALLATION ON HEADWALLS AND PARAPETS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.

\* Block thickness varies.  
Guardrail to be flush with curb.



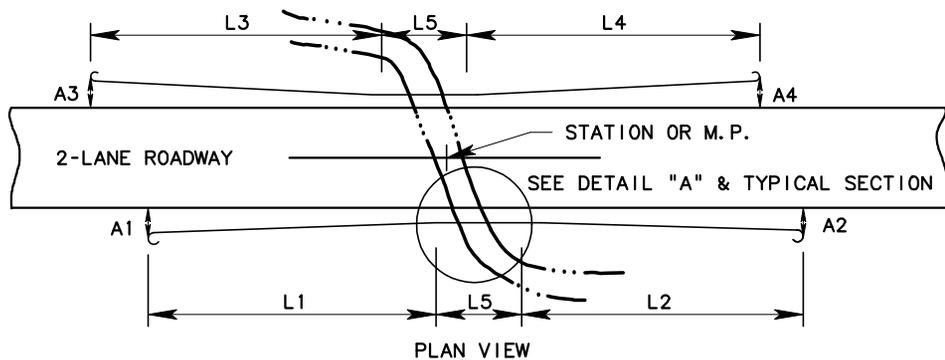
GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

Guardrail to be attached to the structure at a maximum of 3'-1½" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

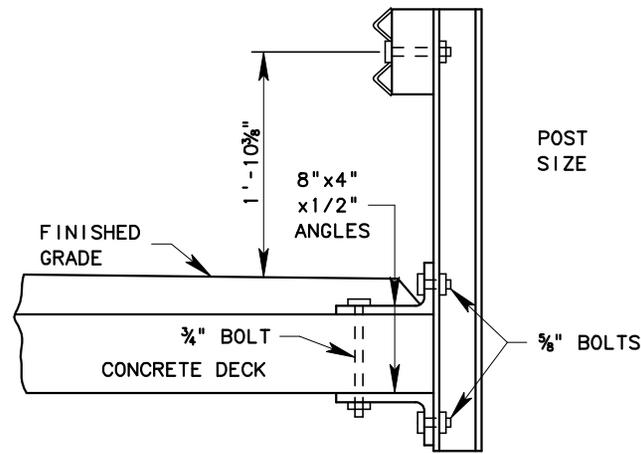
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL INSTALLATION ON BRIDGE PARAPETS

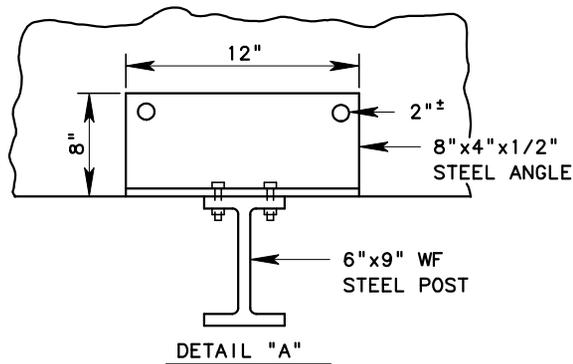
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.



Testing requirements for the bolts and steel angels are waived.



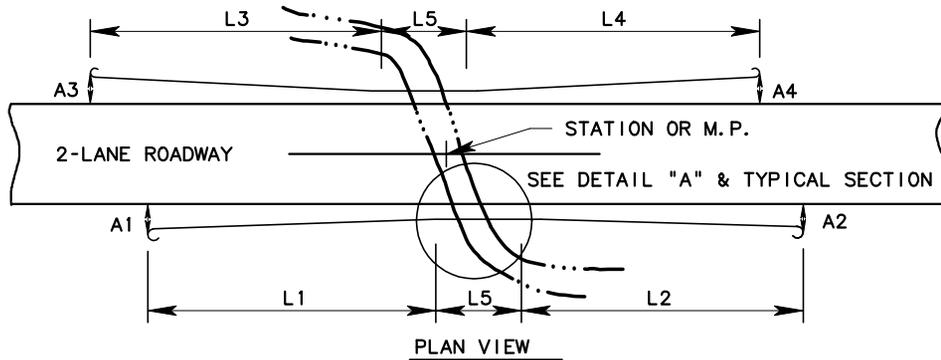
Guardrail to be attached to the structure at a maximum of 3'-1½" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

GUARDRAIL LENGTHS (FT. )	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

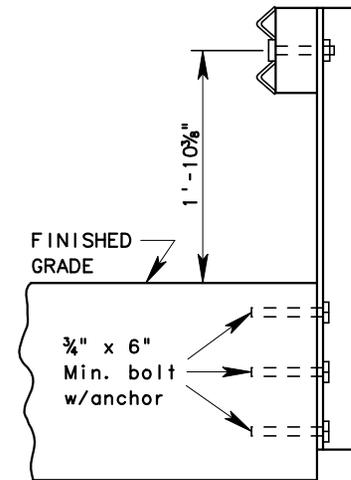
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL INSTALLATION ON BOX CULVERTS AND BRIDGES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



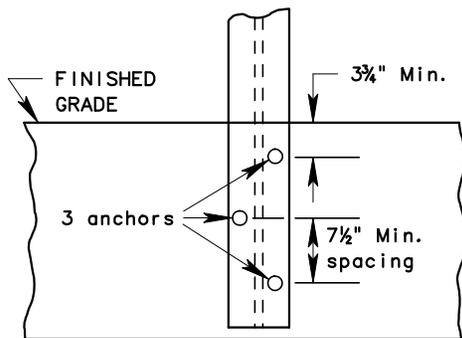
Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.



Guardrail posts to be bolted to outside face of structure.

See Detail A

TYPICAL SECTION ON STRUCTURE



DETAIL "A"

NOTES :

Anchors are to be expanding steel type as manufactured by Phillips Red Head, Hilti Fastening Systems, Molly Parabolt or equal as approved by the Engineer.

Testing requirements for the bolts and steel angels are waived.

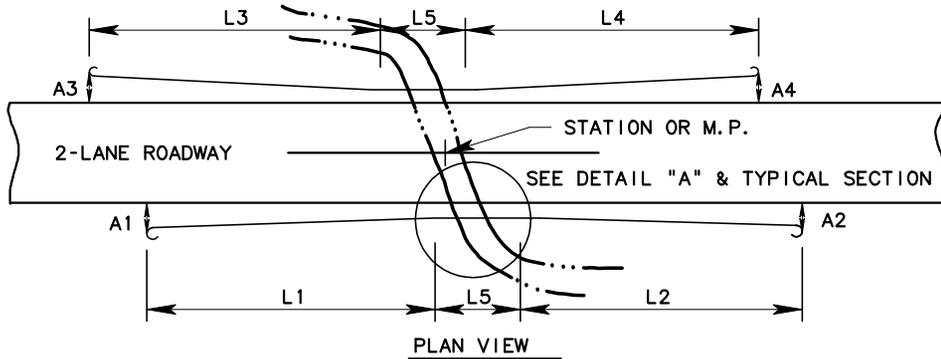
GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2			

Guardrail to be attached to the structure at a maximum of 3'-1 1/2" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

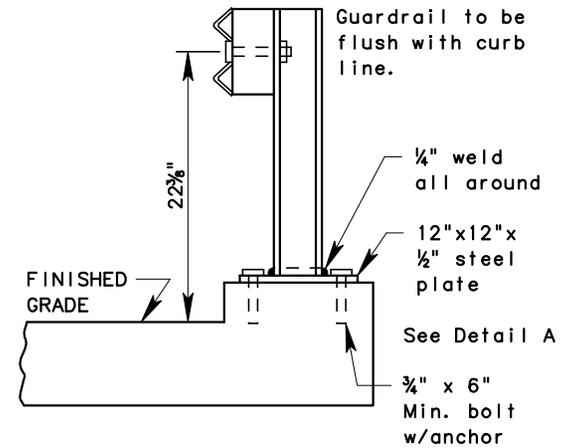
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL INSTALLATION ON BOX CULVERTS AND BRIDGES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



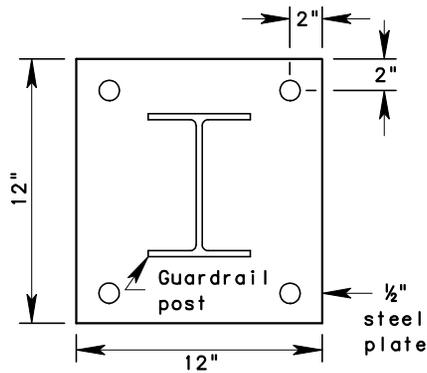
Minimum lengths of L1, L2, L3, and L4 are 43.75' feet unless special circumstances are encountered. Nearby intersection may require shorter lengths and/or curved installations. Refer to Roadside Design Guide to determine point of theoretical need. Length adjustments may be made as per the general notes on standard GR9.



NOTES :

Anchors are to be expanding steel type as manufactured by Phillips Red Head, Hilti Fastening Systems, Molly Parabolit or equal as approved by the Engineer.

Testing requirements for the bolts and steel angels are waived.



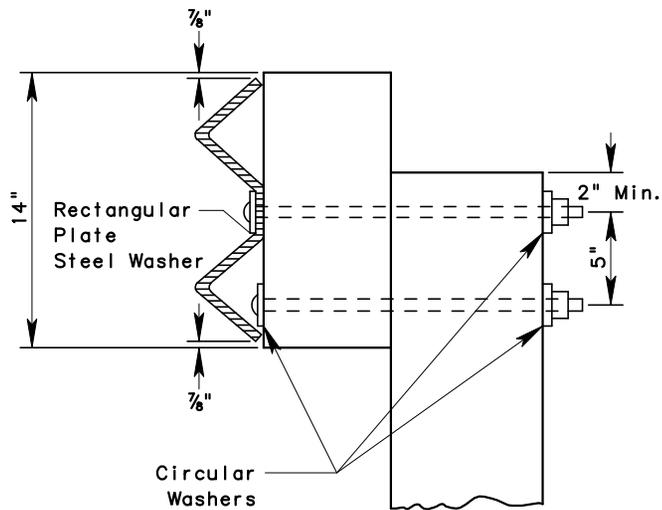
GUARDRAIL LENGTHS (FT.)	CLASS	FET/TET OR/BUF	OFFSET FROM PAVEMENT
L1			A1
L2			A2
L3			A3
L4			A4
L5 X 2		—	—

Guardrail to be attached to the structure at a maximum of 3'-1 1/2" post spacings along the entire length. All bolts, nuts, washers and plates are to be galvanized and meet strength requirements of similar items as depicted in the Standards. The cost of all necessary hardware and installation is to be included in the unit price bid for guardrail. L1, L2, L3 and L4 to have a minimum of 43'-9" with the post spacing for the first 18'-9" as per standard GR9.

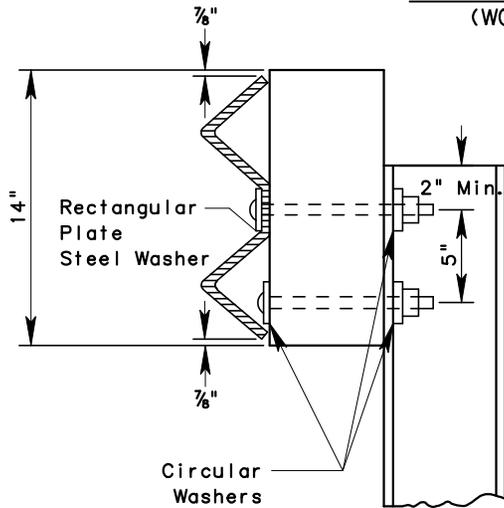
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL INSTALLATION ON BOX CULVERTS AND BRIDGES

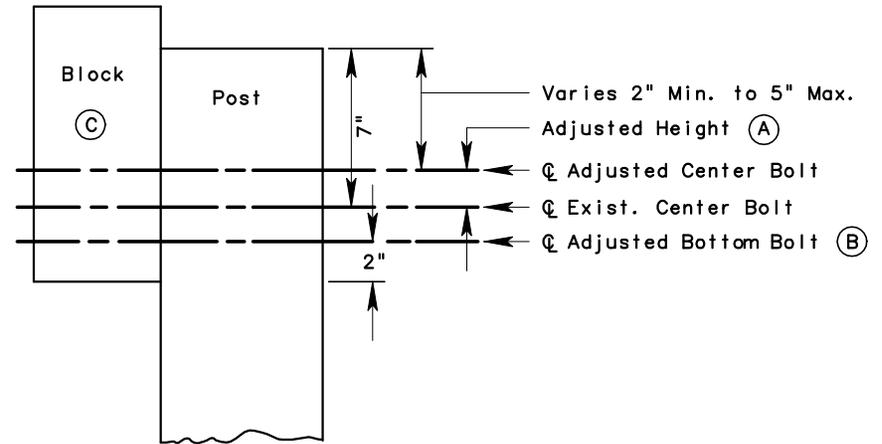
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



WOOD GUARDRAIL POST  
(WOOD BLOCK)



STEEL GUARDRAIL POST  
(WOOD BLOCK)



- (A) Adjustment height as specified in the plans varies from 2" Min. to 5" Max. When adjustments are to be made in a portion of an existing guardrail string, transitions from existing height to specified height shall be :  
Adjustment Height : 2' 3' 4' 5"  
No. of post spacings : 1 2 3 4
- (B) Bottom bolt not required with wood blocks for height adjustment of 3" or less.
- (C) Existing blocks may be redrilled and reinstalled. Existing hardware may be reinstalled as approved by the Engineer.

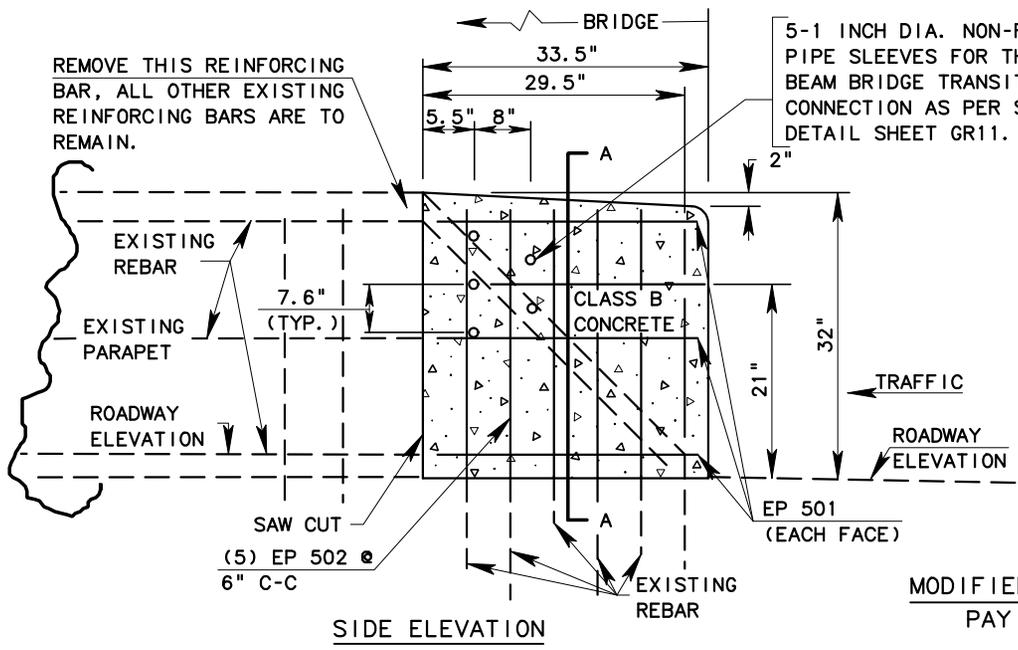
NOTE :

All materials are to conform to the Specifications and Standard Details. All work will be paid for as Item 607009-001, Type 1 Guardrail, Removed and Reset, per L.F.

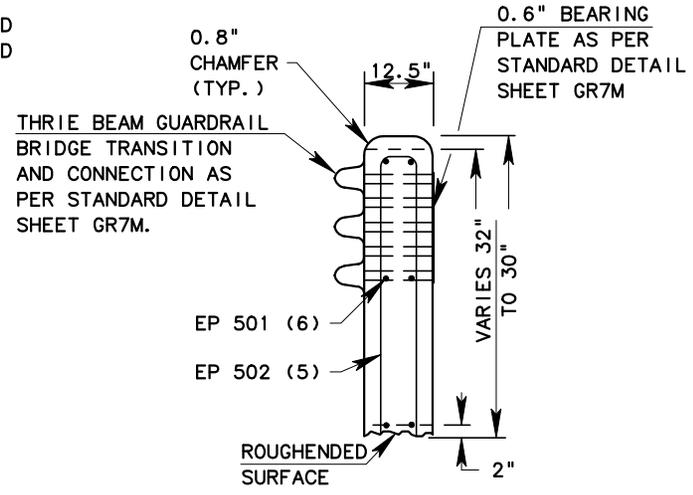
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GUARDRAIL HEIGHT ADJUSTMENT

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



5-1 INCH DIA. NON-RUSTING PIPE SLEEVES FOR THRIE BEAM BRIDGE TRANSITION AND CONNECTION AS PER STANDARD DETAIL SHEET GR11.



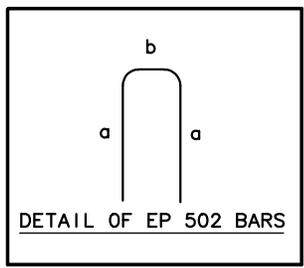
MODIFIED CONCRETE END POST  
PAY ITEM 601046-001

SECTION A-A  
FRONT ELEVATION

**NOTES**

1. EXISTING REINFORCING STEEL BARS AS SHOWN ON THIS SHEET ARE BASED ON ORIGINAL CONSTRUCTION PLAN SHEETS. FIELD MODIFICATIONS IN ORDER TO MEET EXISTING REINFORCING STEEL BARS SHOULD BE EXPECTED.
2. MAINTAIN 2 INCH MINIMUM CLEARANCE BETWEEN REINFORCEMENT AND FORMS.

REINFORCING STEEL BARS		NO. OF BARS	LENGTH (INCH)			TYPE
MARK	SIZE		a	b	TOTAL	
EP 501	NO. 15	6			32	STRAIGHT
EP 502	NO. 15	5	30	8	68	BENT



NOT TO SCALE

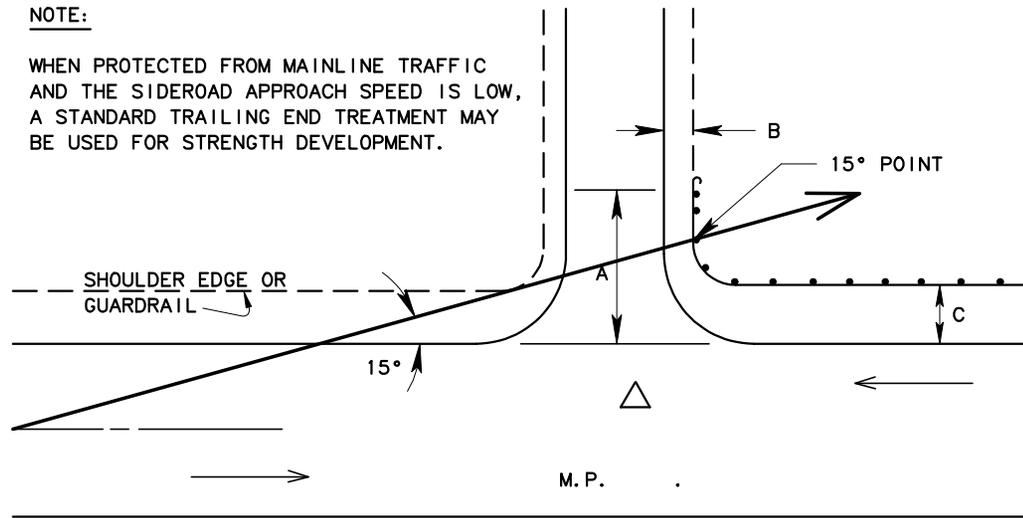
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**MODIFIED CONCRETE END POST**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC AND THE SIDEROAD APPROACH SPEED IS LOW, A STANDARD TRAILING END TREATMENT MAY BE USED FOR STRENGTH DEVELOPMENT.

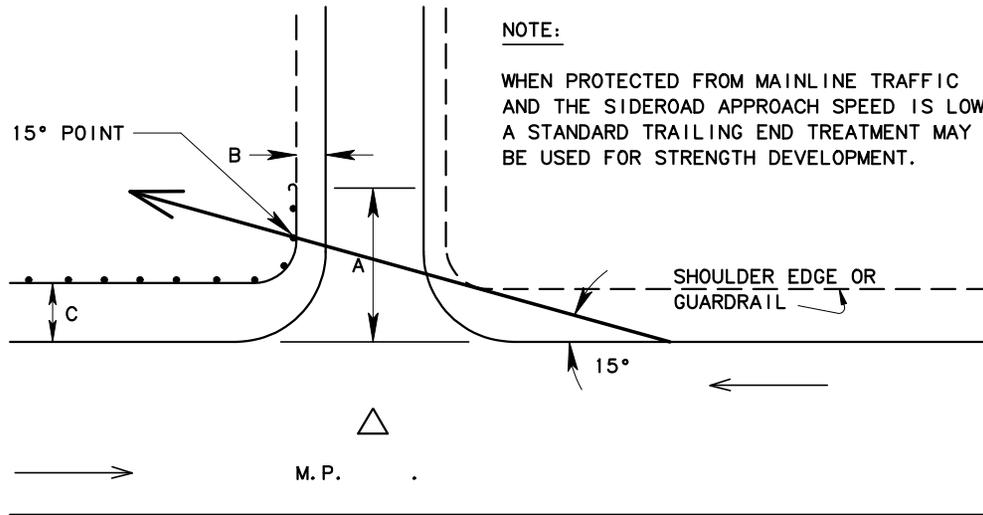


A	
B	
C	
END TREATMENT	

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL PLACEMENT AT INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



A	
B	
C	
END TREATMENT	

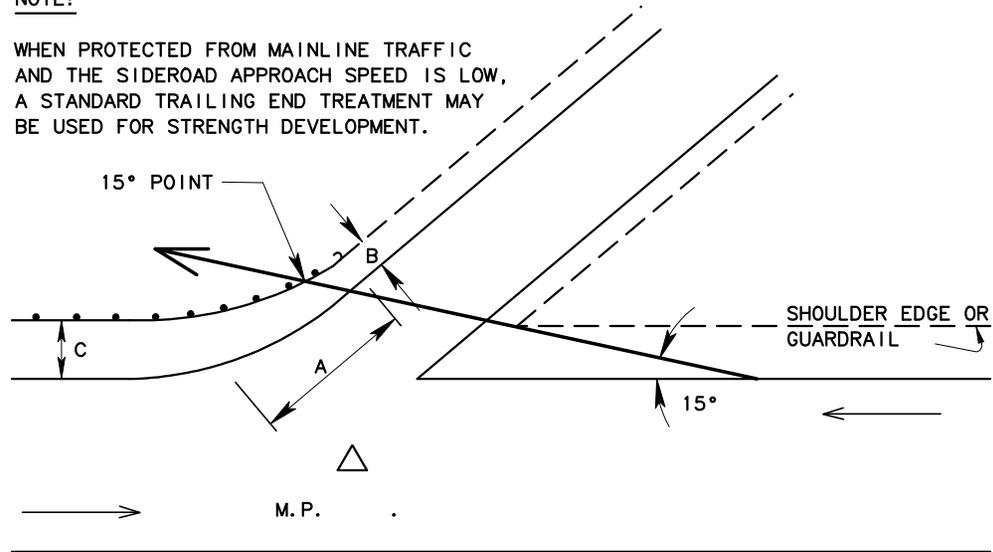
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL PLACEMENT AT INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC AND THE SIDEROAD APPROACH SPEED IS LOW, A STANDARD TRAILING END TREATMENT MAY BE USED FOR STRENGTH DEVELOPMENT.



A	
B	
C	
END TREATMENT	

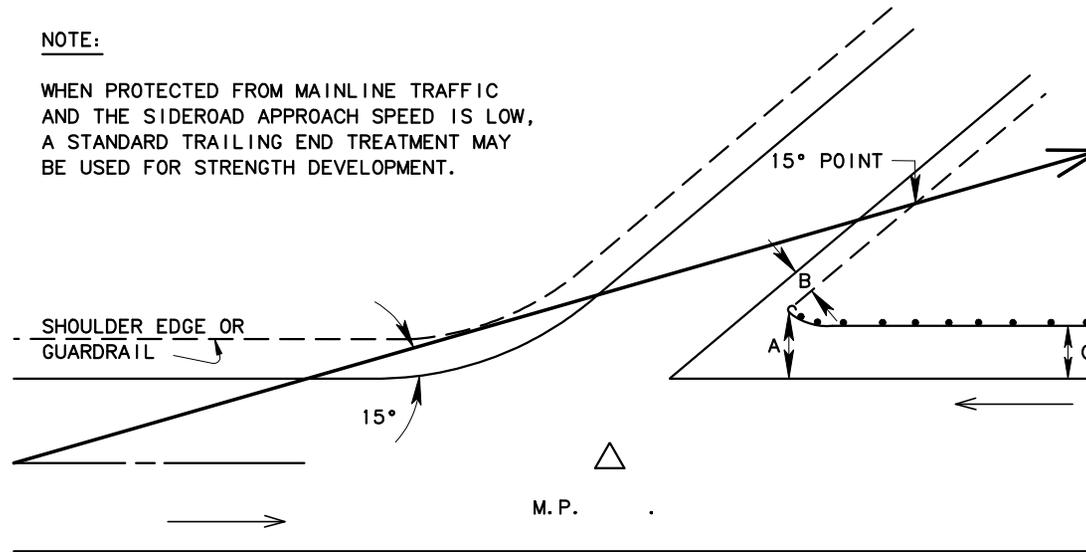
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC AND THE SIDEROAD APPROACH SPEED IS LOW, A STANDARD TRAILING END TREATMENT MAY BE USED FOR STRENGTH DEVELOPMENT.



A	
B	
C	
END TREATMENT	

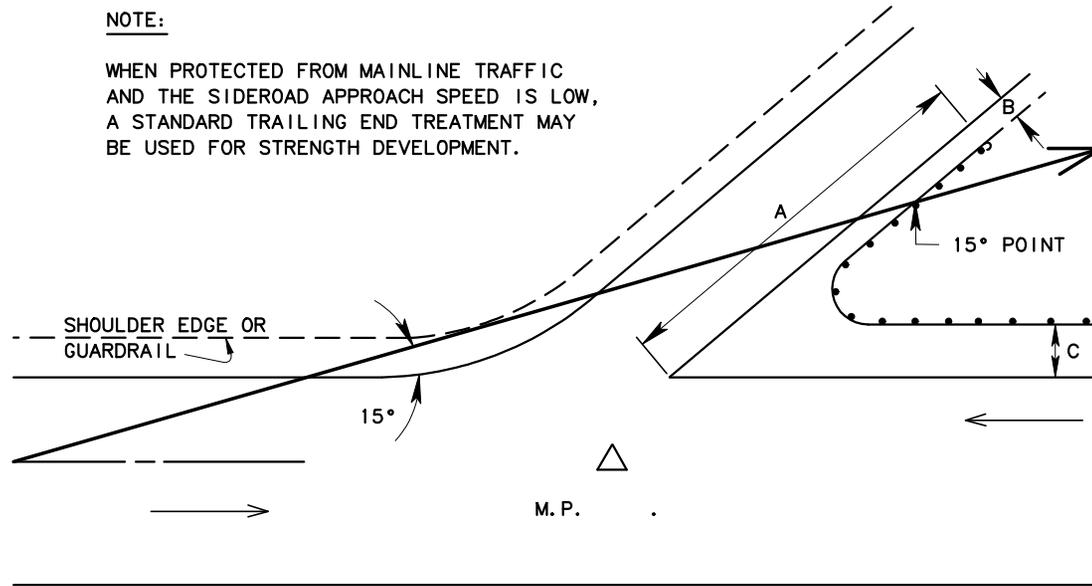
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

NOTE:

WHEN PROTECTED FROM MAINLINE TRAFFIC AND THE SIDEROAD APPROACH SPEED IS LOW, A STANDARD TRAILING END TREATMENT MAY BE USED FOR STRENGTH DEVELOPMENT.



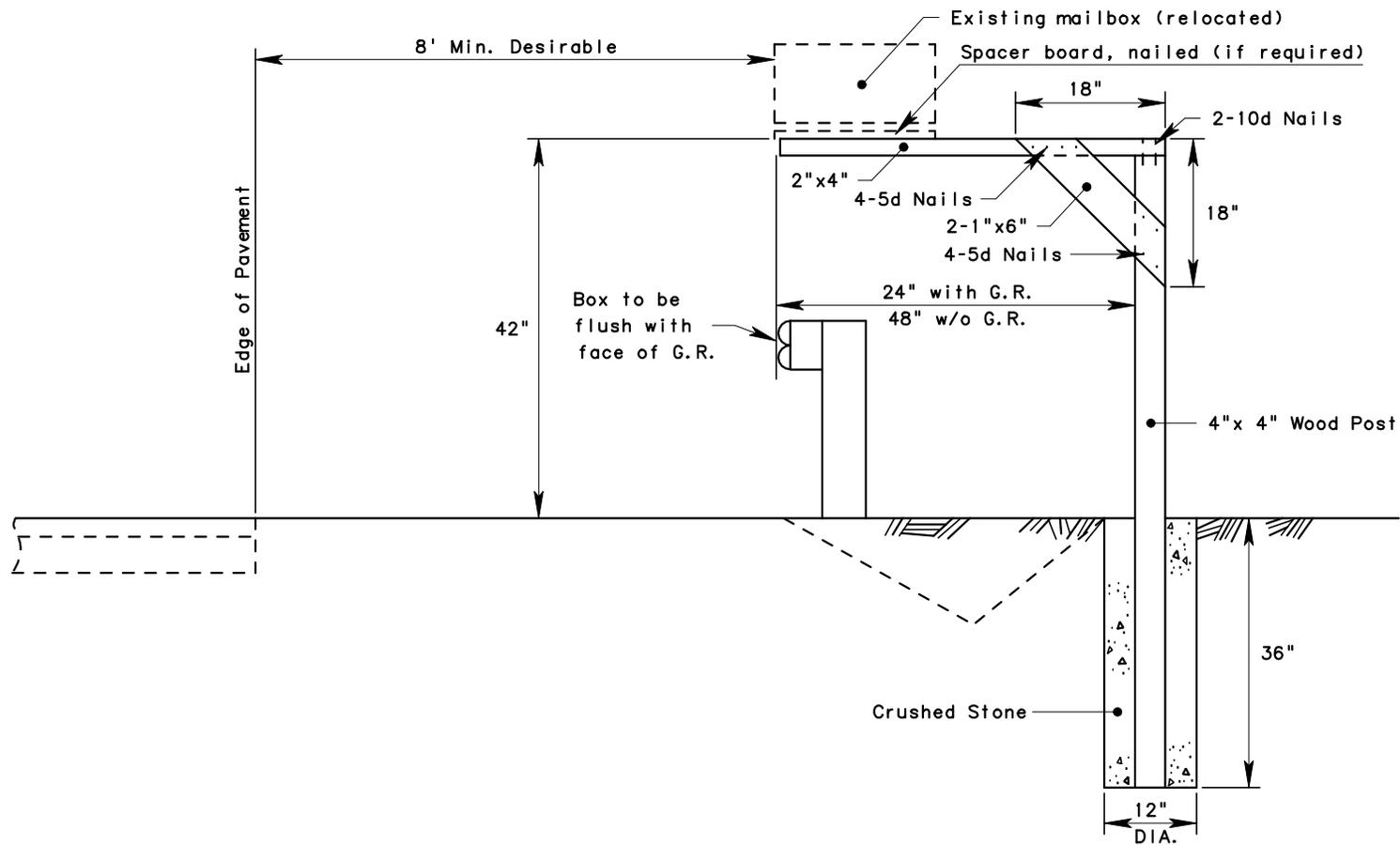
A	
B	
C	
END TREATMENT	

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

# GUARDRAIL PLACEMENT AT SKEWED INTERSECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				





**NOTES :**

All wood is to be pressure treated pine. Testing of the materials will not be required. The cost of all work and materials to construct mailbox support, remove existing mailbox support, and relocate existing mailbox onto new support at locations as shown on the plans or as directed by the Engineer, is to be included in the unit price for Item 622003-001, Cantilever Mailbox Support, per each.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

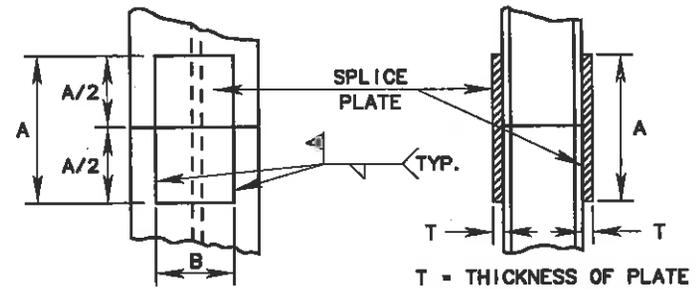
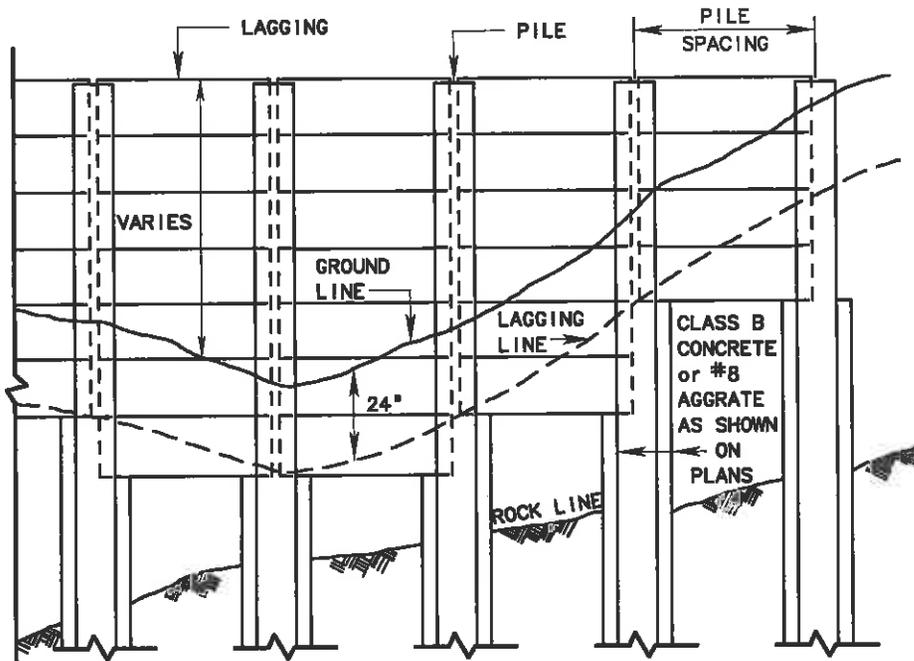
**CANTILEVER MAILBOX SUPPORT**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



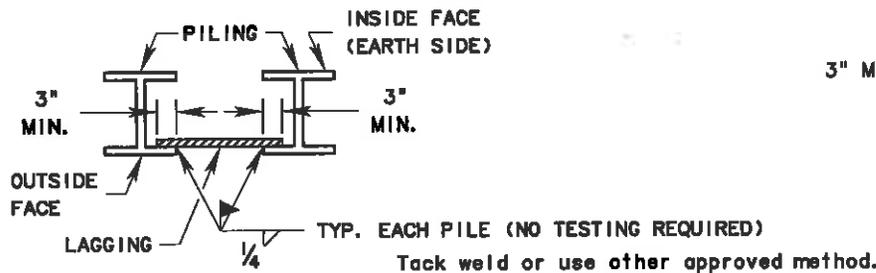


**PILING TYPICAL FRONT ELEVATION VIEW**

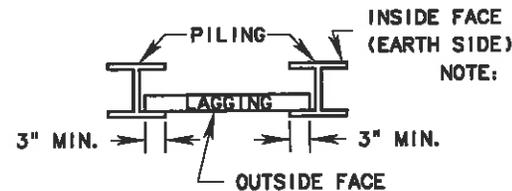


**SPLICE DETAIL**

PILING SIZE	A (INCHES)	B (INCHES)	T (INCHES)	WELD SIZE

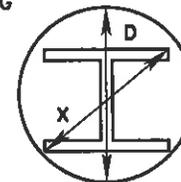


**DETAIL "A"  
STEEL LAGGING**



**DETAIL "A-A"  
CONCRETE LAGGING**

NOTE: Lagging shall be in contact with piling at all faces. Method shall be approved to hold lagging in place during backfill operation.



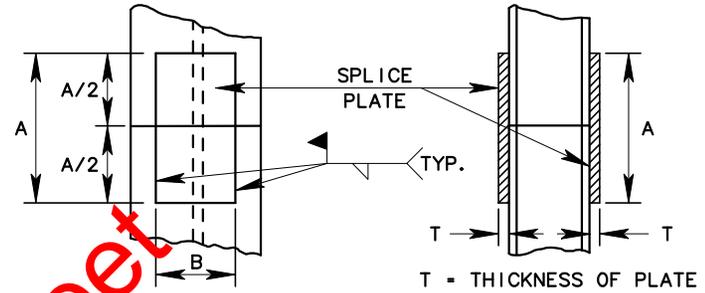
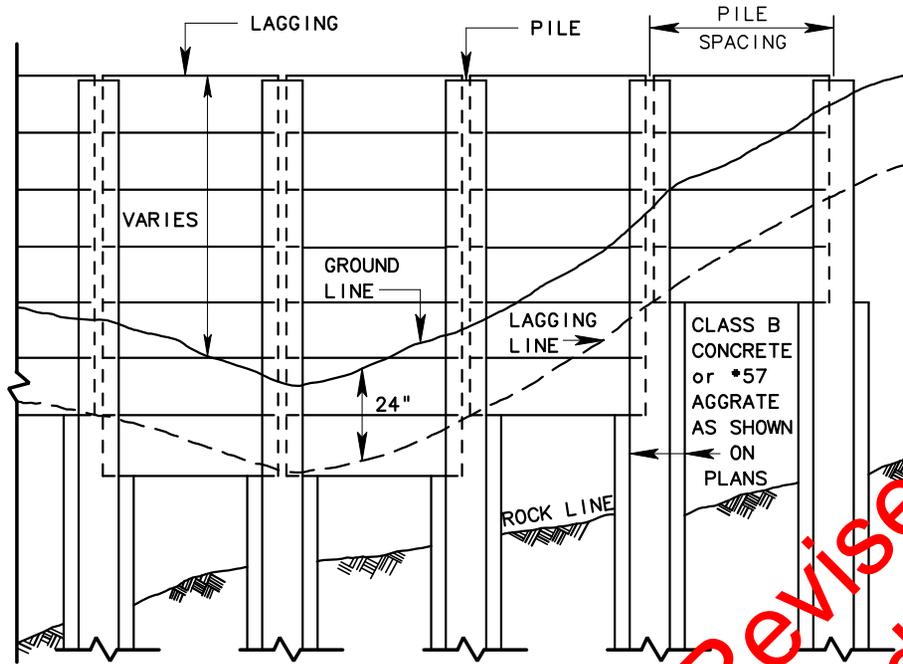
Diameter (D) of drilled hole shall be Min. 2 inches greater than diagonal (X) measurement of piling.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**PILING DETAILS (2 OF 3)**

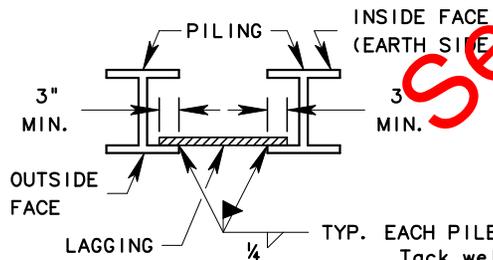
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

PILING TYPICAL FRONT ELEVATION VIEW



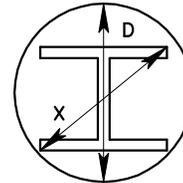
SPLICE DETAIL

PILING SIZE	A (INCHES)	B (INCHES)	T (INCHES)	WELD SIZE



DETAIL "A"  
STEEL LAGGING

EACH PILE (NO TESTING REQUIRED)  
Tack weld or use other approved method to hold lagging in place during backfill operation. No requirements for length of weld or spacing.

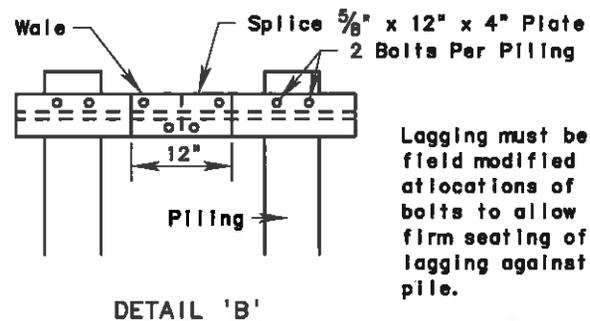
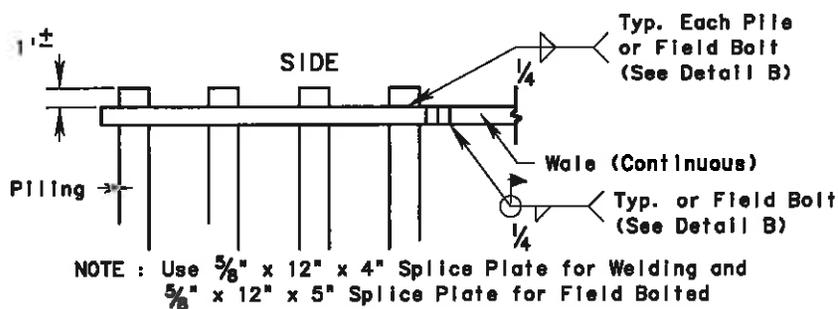
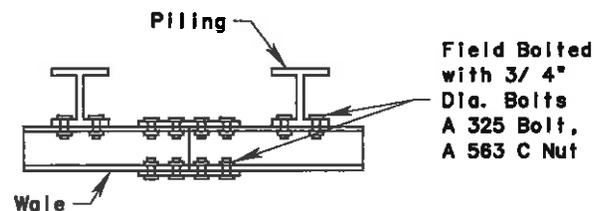
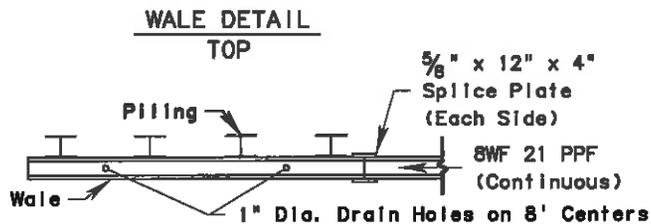


Diameter (D) of drilled hole shall be Min. 2 inches greater than diagonal (X) measurement of piling.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PILING DETAILS (2 OF 3)

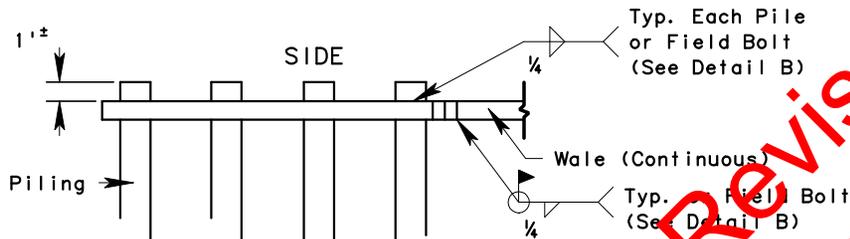
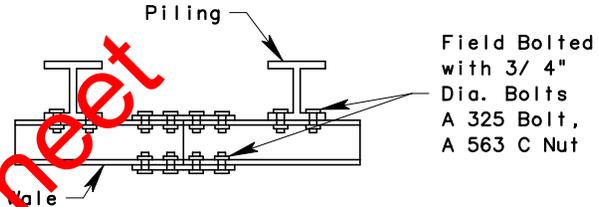
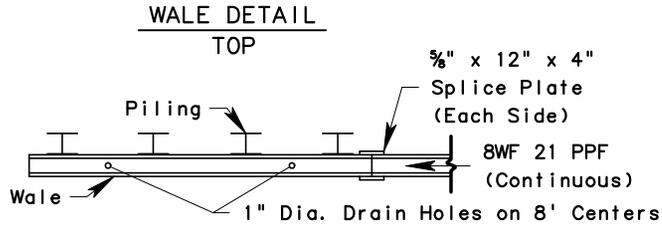
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



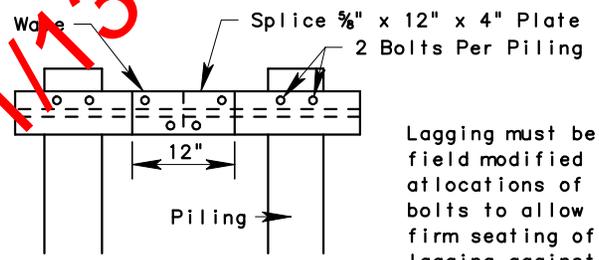
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**PILING DETAILS (3 OF 3)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



NOTE : Use  $\frac{5}{8}$ " x 12" x 4" Splice Plate for Welding and  $\frac{5}{8}$ " x 12" x 5" Splice Plate for Field Bolted



Lagging must be field modified at locations of bolts to allow firm seating of lagging against pile.

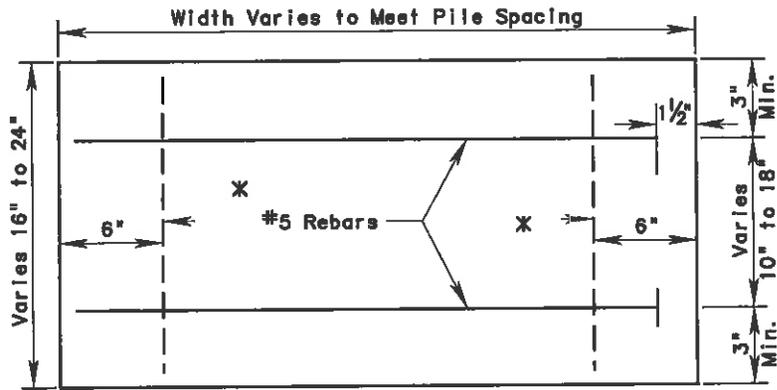
**DETAIL 'B'**

See Revised Sheet Dated 8/17/13

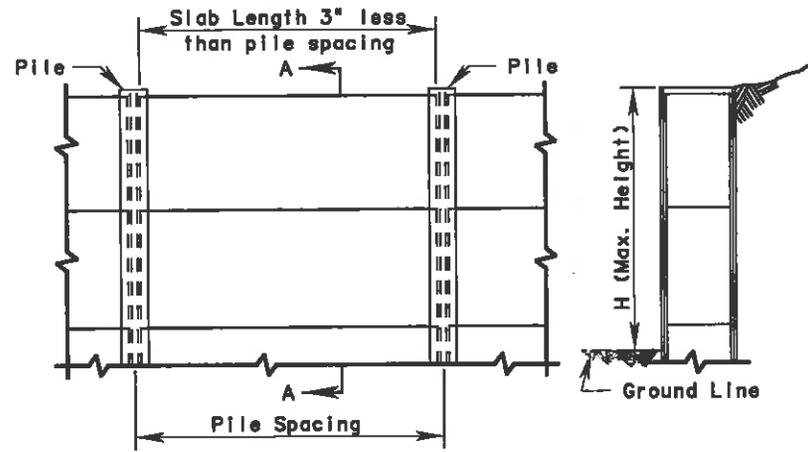
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**PILING DETAILS (3 OF 3)**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

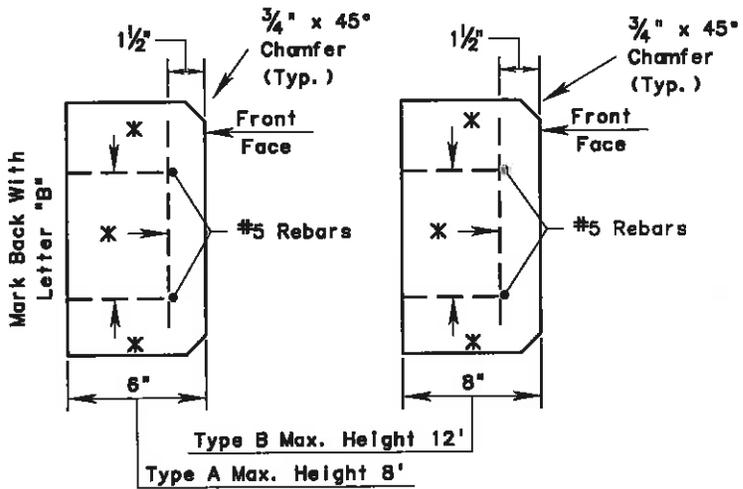


**ELEVATION VIEW**



**ELEVATION OF WALL**

**SECTION A-A**



**END VIEW**

**NOTES:**

All concrete shall be class B Compressive strength of concrete, at 28 days, (f'c) shall not be less than 3000 p.s.i.

All concrete is to be Air-entrained 7% not to exceed  $\pm 2.5\%$ .

Cure In Accordance To M-199.

All reinforcing steel shall be grade 60 KSI

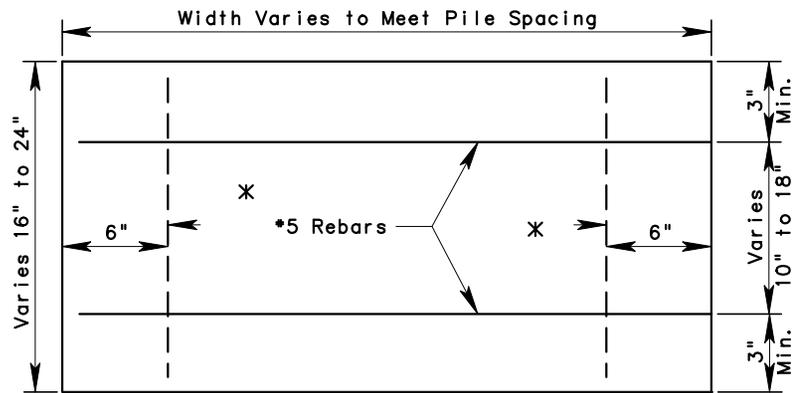
X Optional Rebars  
For Use In Fabrication

**TYPICAL DETAILS FOR CONCRETE LAGGING**

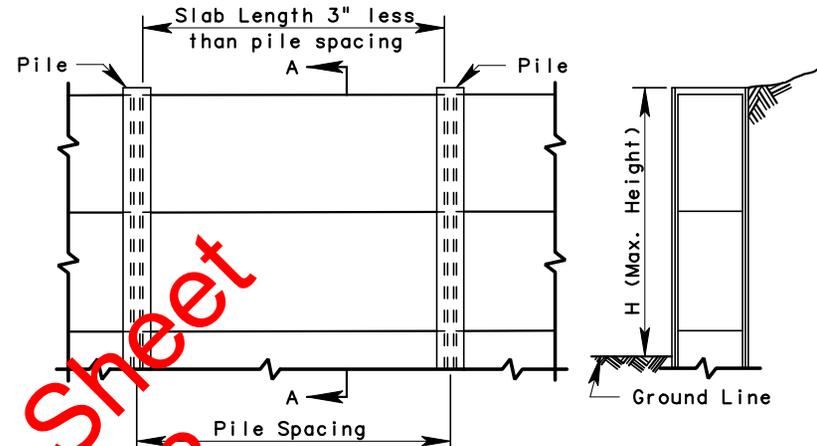
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

**PRECAST CONCRETE LAGGING**

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				

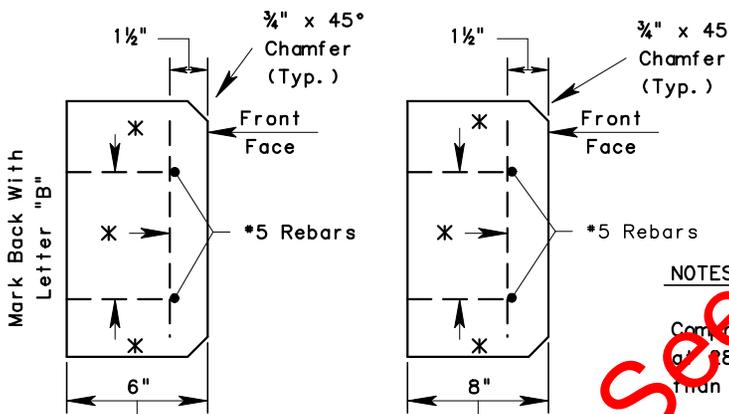


ELEVATION VIEW



ELEVATION OF WALL

SECTION A-A



END VIEW

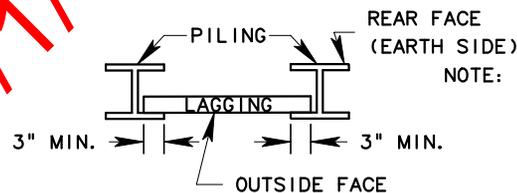
SOLID CONCRETE LAGGING

NOTES:

Compressive strength of concrete, at 28 days (f'c) shall not be less than 3000 p.s.i.

All concrete is to be Air-entrained 7% not to exceed ±2.5%.  
Cure In Accordance To M-199.

\* Optional Rebars  
For Use In Fabrication



DETAIL 'A-A'

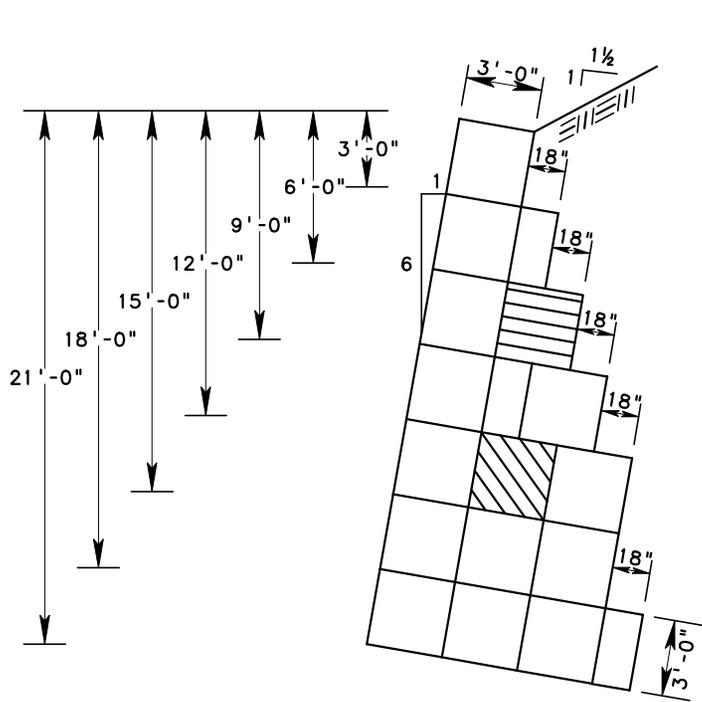
TYPICAL DETAILS FOR CONCRETE LAGGING

NOTE: Lagging shall be in contact with piling at all faces. Method shall be approved to hold lagging in place during backfill operation.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

PRECAST CONCRETE LAGGING

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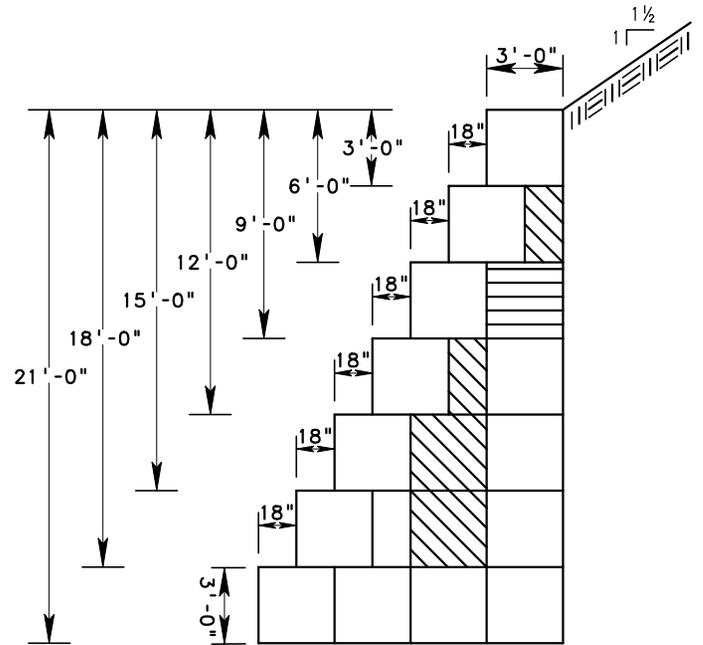
1.) SECTIONS SHOWN HATCHED DO NOT REQUIRE GABION MESH UNLESS THEY ARE IN THE BOTTOM COURSE OF THE WALL.



2.) SECTION SHOWN HATCHED MAY BE COUNTERFORTED BY USING CODE "A" GABIONS ALTERNATELY AS HEADERS AND STRETCHES.



3.) INTERMEDIATE HEIGHTS OF WALL MAY BE OBTAINED BY USING IN ONE OF THE COURSES 18" OR 12" HIGH GABIONS.

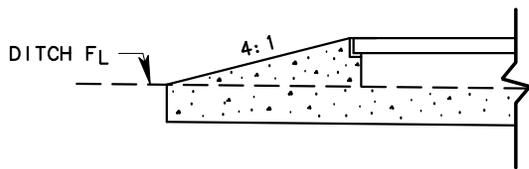
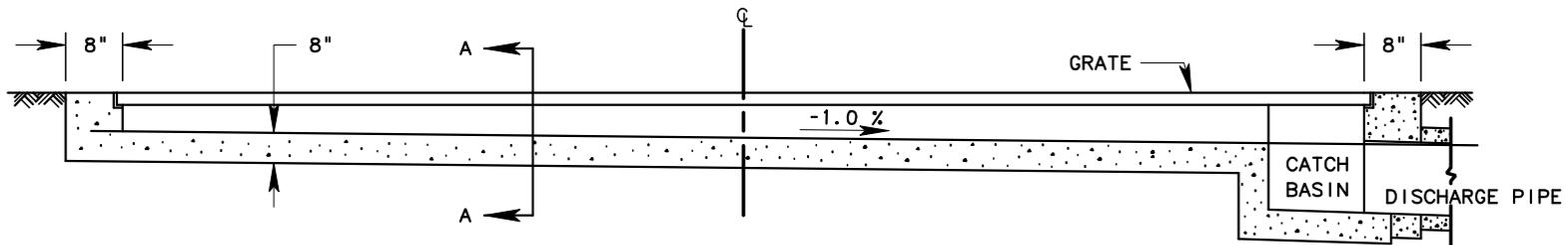


THE COST FOR ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO CONSTRUCT THE GABIONS IN ACCORDANCE WITH THE ATTACHED DETAIL SHALL BE INCLUDED IN THE UNIT BID PRICE OF ITEM 218003-000.

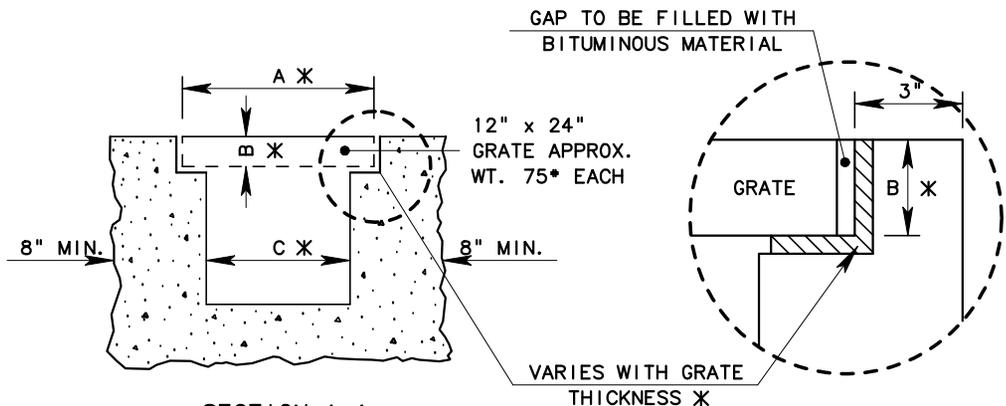
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

## GABION RETAINING WALLS

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FLOW THROUGH  
END DETAIL



SECTION A-A

DETAIL  
SECTION A-A

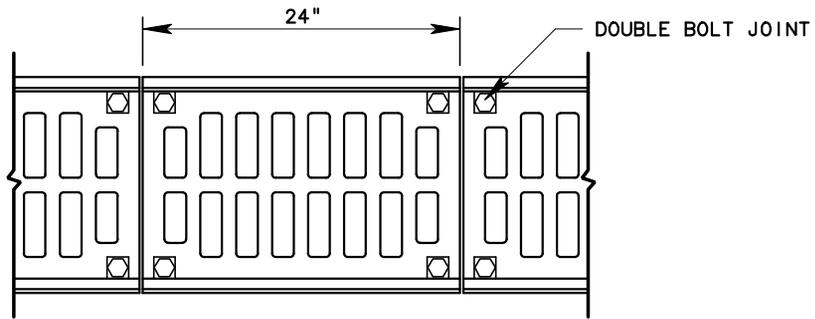
NOTE: ALL CONCRETE SHALL BE CLASS "B". THE COST FOR ALL MATERIALS AND LABOR NEEDED TO CONSTRUCT THE CONCRETE BOX DITCH IN ACCORDANCE WITH ACCOMPANYING DETAIL IS TO BE INCLUDED IN ITEM 605004-005, CONCRETE BOX DITCH PER L.F.

x SEE TABLE ON SHEET 2 FOR DIMENSIONS

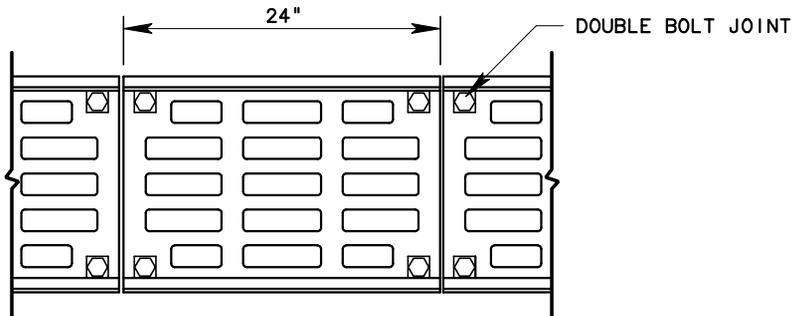
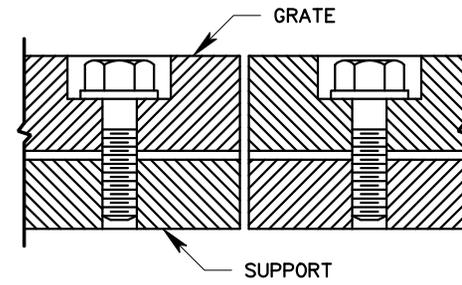
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE BOX & GRATE DETAIL (1 OF 2)

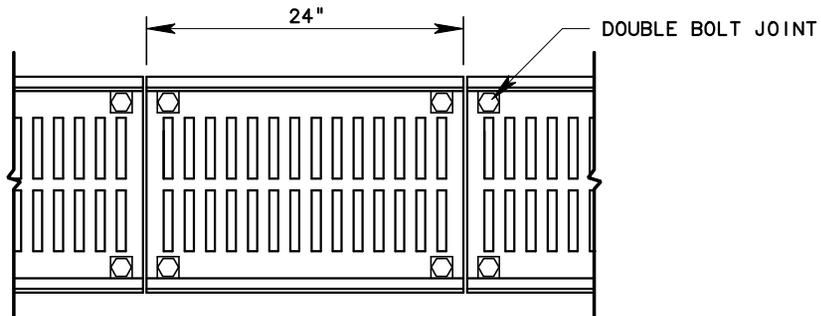
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	County
W. V.				



TYPE "A" GRATE



TYPE "C" GRATE



TYPE "P" GRATE

DIMENSIONS IN INCHES			WEIGHT PER LINEAL FOOT			
A	B	C	TYPE A	TYPE C	TYPE P	FRAME
8	1½	6	18	24	19	12
10	1½	8	24	30	22	12
12	1½	10	28	35	26	12
14	1½	12	35	45	31	12
17	1½	15	41	59	--	12
20	1½	18	57	67	--	12
23	1½	21	60	78	--	12
26	1½	24	68	110	--	12
30	2	27	100	130	--	17
33	2	30	120	150	--	17
36	2	33	115	140	--	17
39	2	36	130	210	--	17
45	2	42	150	260	--	17
51	2	48	175	--	--	17

WEIGHT PER FOOT-INCLUDES BOTH SIDES.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

CONCRETE BOX & GRATE DETAIL (2 OF 2)

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THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

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