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| GR 15 | GUARDRAIL MODIFICATIONS |

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<td>F 4</td>
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## MARKERS AND MAILBOX

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>M 2</td>
<td>MAILBOX</td>
</tr>
</tbody>
</table>
**NOTES**

All concrete shall be Class "B" Concrete.

All concrete edges shall have a 3/4" x 45° chamfer. Chamfer on vertical edges shall be continued a minimum of one foot below finished ground line.

When heads are placed on the inlet end of corrugated metal pipe or bevel concrete pipe, a bevel shall be used at the inlet opening. The end of the pipe shall be set in from the face of the wall 1/8" to accommodate the drain pipe constructed from the end of the pipe to the face of the wall.

When heads are placed on the inlet end of concrete pipe, the "bead" or "groove" of the pipe shall be placed in the wall in lay of the bead, except when the pipe is to be cut for placing in shaped heads. The inside of the "bead" or "groove" shall be filled with concrete up to the flow line.

Seams shall not be required on outlet heads.

Reinforcing shall conform to the requirements of 706.3 and 706.4 of the Specifications.

Reinforcing, as detailed herein, shall be used in all walls of headwalls structures. The covering for the reinforcing shall be 2 inches minimum, measured from the surface of the concrete to the face of the bars, unless otherwise specified. The concrete shall be at least 3 inches thick in the wall and may be otherwise cut or field bent to fit the structure.

In lieu of the reinforcing described above, as shown reinforcing steel bars meeting the requirements of 708.1 of the Specifications may be used in these structures. Covering for the reinforcing shall be two inches measured from the surface of the concrete to the face of the bars, unless otherwise specified. Bars shall be furnished in such lengths, or field bent or cut as necessary, to fit the structures and to accommodate the pipe openings in the wall.

Keyed or dovetailed construction joints, acceptable to the Engineer, may be used during construction.

The pay quantity for Straight headwalls, constructed in accordance with the details herein, within the cubic yards of Class B Concrete specified herein. Cost of all reinforcing fabric and reinforcing bars shall be included in the unit price bid for "Class B Concrete".

---

**ELEVATION**

**SECTION Y-Y**

**BEVEL DETAIL** (Section Thru Center Of Pipe)

**BEVEL DIMENSIONS**

<table>
<thead>
<tr>
<th>Diameter of Pipe</th>
<th>Depth</th>
<th>Length</th>
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<tr>
<td>D</td>
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</tr>
<tr>
<td>H</td>
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---

**PLAN VIEW**

**STRaight HEADWALL**

(Corrugated Metal Pipe Shown)

---

**DIMENSIONS**

**Diameters of Pipe**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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</thead>
<tbody>
<tr>
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<td>1 1/4&quot;</td>
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<td></td>
</tr>
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**QUANTITIES**

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</tbody>
</table>

---

**WHY VERMONT DEPARTMENT OF TRANSPORTATION**

**DIVISION OF HIGHWAY**

**STANDARD SHEET ORI**

**PIPE CULVERT HEADWALLS**

---
NOTES

The "Notes" and the "Construction Details-Skew Wall" on Standard Sheet DR2 (Sheet 1 of 2) shall apply to this sheet.

Anchor bolts shall be used on wingwalls for corrugated metal and structural plate pipe greater than 48" in diameter. Anchor bolts are not required for concrete pipe.

Anchor bolts and nuts shall conform to the requirements for "Wingwall Anchorage" hardware as specified in AASHTO Specification M-67. Anchor bolts and nuts shall be cleaned after galvanizing to provide a free running fit.

Cost of the anchor bolts and nuts shall be included in the unit price bid for the pipe.

Right-of-way fence hardware inserts shall be installed in the sidewalks during the construction of wingwalls for pipes over 48" in diameter.

Dimensions and location of inserts shall conform to the "Drainage Structure Terminal Installation" detail of the applicable right-of-way fence standard.

Waterstop meeting the requirements of 708.10 shall be placed as shown when concrete gutter is to abut the wingwall.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
STANDARD SHEET DR2

PIPE CULVERT
WINGWALLS
(SHEET 2 OF 4)
<table>
<thead>
<tr>
<th>ID</th>
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<th>DIMENSIONS</th>
<th>REINFORCEMENT</th>
<th>QUANTITY</th>
<th>ID</th>
<th>PIPE</th>
<th>DIMENSIONS</th>
<th>REINFORCEMENT</th>
<th>QUANTITY</th>
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</tr>
</tbody>
</table>

**PIPE CULVERT**

**WINGWalls**

(SHEET 4 OF 4)

**STANDARD SHEET 032**
NOTES

THIS INLET SHOULD ONLY BE SPECIFIED WHEN MIVITING
CONCRETE PAVEMENT

THE FINAL INSTALLED TOP SURFACE OF INLET AND GRATE
SHALL BE FLUSH WITH ADJACENT FINISHED SURFACES SUCH AS PAVEMENT,
GUTTERS, CURBS, AND SIDEWALKS. TOP OF GRATE ELEVATION, IF SHOWN
ON THE PLANS, IS FOR INFORMATION ONLY.

CONSTRUCTION MAY BE CAST-IN-PLACE, PRECAST IN ONE OR
MULTIPLE SECTIONS, OR ANY COMBINATION OF CAST-IN-PLACE AND PRECAST.

REBARS ARE TO BE INSTALLED AT THE THIRD POINTS
TO CONNECT CURB TO INLET. REBARS ARE NOT REQUIRED IF CURB
IS POURRED MONOLITHICALLY WITH INLET OR IF TYPE V OR VI
MEDIAN IS SPECIFIED ON THE PLANS.

FOR DETAILS OF GRATE SUPPORT BAR, SHALLOW FRAME,
AND GRATES (TWO REQUIRED, SEE INLET CASTINGS STANDARD
SHEET D65). USE OF THE SHALLOW FRAME WILL BE LIMITED TO
ROADWAYS CONSTRUCTED OF CONCRETE PAVEMENT, IF
ADJACENT ROADWAY IS BUILT OF HOT MIX ASPHALT PAVEMENT.
THE FRAME AS REQUIRED FOR TYPE A INLET (STANDARD
SHEET D65) WILL BE REQUIRED.

THE CONTRACTOR MAY, AT HIS OPTION, OMIT USE OF
THE FRAME BY FORMING A LEDGE IN THE CONCRETE.

SPECIAL CARE SHALL BE EXERCISED IN FORMING THE 2" WIDE CONCRETE LEDGE TO PROVIDE A SMOOTH EVEN SURFACE FOR
SUPPORTING THE GRATES IF THE SHALLOW FRAME IS NOT USED.
NO PROJECTIONS SHALL EXIST ON THE BEARING SURFACES OF THE
LEDGE OR THE GRATES, AND THE GRATES SHALL NOT ON THE
LEDGE WITHOUT RISKING.

OPTIONAL CONSTRUCTION JOINTS Labeled "C" MAY BE
RELEVENTED CONCRETE, KEYED OR DOVELED AS PER THE TYPICAL DETAILS
SHOWN HEREIN OR AS APPROVED BY THE ENGINEER. NON SHANKED REBAR MEETING THE REQUIREMENTS OF SUBSECTION 715.5 OF THE SPECIFICATIONS
MAY BE USED TO A DEPTH OF 1/4" FOR LEVELING BETWEEN PRECAST
SECTIONS. THINNER DEPTHS WILL BE ALLOWED AS PER THE
MANUFACTURER'S RECOMMENDATIONS.

PC (MINIMUM PIPE COVER) SHALL BE 12" BELOW INLET
TOP FOR PIPES PLACED UNDER SIDEWALK OR GRASSED AREA
OR 24" BELOW INLET TOP FOR PIPES PLACED UNDER PAVEMENT
OR SHOULDER.

CURB, IF SPECIFIED, MAY BE EITHER CONCRETE PLACED
ON THE INLET BACKFILL AS DETAILED HEREIN OR AN APPROVED
CURB BOX AS MANUFACTURED WITH THE GRATE AND FRAME.
DIMENSIONS OF THE CURB BOX SHOULD BE CONSISTENTLY
TO THE STANDARD CURB AS SPECIFIED ON THE PLANS. THE
CURB WILL BE PAID FOR PER SECTION 610, IN EITHER CASE.

THIS INLET SHALL NOT BE PLACED IN A PEDESTRIAN
CROSS WALK.

THE MINIMUM DISTANCE FROM THE TOP OF ANY PIPE
OPENING TO ANY CONSTRUCTION JOINT ABOVE THE OPENING
SHALL BE FOUR INCHES.

THE NUMBER AND LOCATION OF PIPE OPENINGS SHALL
BE AS SHOWN IN THE PLANS. THE CONTRACTOR AT NO ADDITIONAL
COST, SHALL BE RESPONSIBLE FOR ANY TEMPORARY BRACING
REQUIRED TO TRANSPORT PRECAST INLET SECTIONS DUE TO
MULTIPLE OPENINGS.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF HIGHWAYS
CONTRACT NO.
STANDARD DETAIL

TYPE A INLET

STANDARD SHEET D65-A
NOTES

The final installed top surface of inlet and grate shall be flush with adjacent finished surfaces such as pavement, gutters, curbs, and sidewalks. Top of grate elevation, if shown on the plans, is for information only.

Construction may be cast-in-place, precast in one or multiple sections, or any combination of cast-in-place and precast.

Rebars are to be installed at the quarter points to connect curbs to inlets. Rebars are not required if curb is poured monolithically with inlet or if type V, V, and V, medium is specified on the plans.

For details of grate support bar, shallow frame, and grate, see inlet castings standard sheet D-8-11-1.

The contractor may, at his option, omit use of the frame by forming a ledge in the concrete.

Special care shall be exercised in forming the 2" wide concrete ledge to provide a smooth, even surface for support of the grate and shallow frame. No projections shall exist in the bearing surfaces of the ledge or the grate shall rest on the ledge without rocking.

Optional construction joints labeled "CJ" may be roughened concrete-actuated or drilled as per the typical details shown herein or as approved by the Engineer. Non-shrink cement meeting the requirements of subsection 713-5 of the specifications may be used to a depth of 1/4" for leveling between precast sections. Thicker depths will be allowed as per the manufacturer's recommendations.

PC (minimum pipe cover) shall be 12" below inlet top for pipes placed under sidewalks or grassed area or 24" below inlet bottom for pipes placed under pavement or roadway.

Curb, if specified, may be either concrete placed on the inlet backwall as detailed herein or an approved curb box as manufactured with the grate and frame. Dimensions of the curb box should reasonably conform to the standard curb as specified on the plans. The curb will be paid for per section 800 in either case.

This inlet shall not be placed in a pedestrian cross walk.

The minimum distance from the top of any pipe opening to any construction joint above the opening shall be four (4) inches.

The number and location of pipe openings shall be as shown in the plans. The contractor at an additional cost, shall be responsible for any temporary bracing required to transport precast inlet sections due to multiple openings.
**NOTES**

Optional construction joints labeled "LC" may be roughened concrete, keyed or divided as per the typical details shown herein or as approved by the Engineer. Non-compliance with the requirements of subsection 775.5 of the Specifications may be used to a depth of 1/2" for leveling between precast sections. Thicker depths will be allowed if as per the manufacturer's recommendations.

The covering for reinforcing steel should be at least two inches, measured from the surface of the concrete to the face of the bar, unless otherwise shown. The reinforcing steel shall be epoxy coated and meet the requirements of section 602 of the Specifications.

This inlet shall not be placed in a pedestrian crosswalk.

Construction may be cast-in-place, precast in one or multiple sections, or a combination of cast-in-place and precast.

The minimum distance from the top of any pipe opening to any construction joint above the opening shall be four (4) inches.

The number and location of pipe openings shall be as shown in the plans. The contractor shall be responsible for any additional bracing required to transport precast inlet sections due to multiple openings.

**CONSTRUCTION JOINT DETAILS**

**BILL OF STEEL**

<table>
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<th>Size Bar</th>
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<td>7</td>
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<tr>
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<tr>
<td>E</td>
<td>H</td>
<td>2</td>
<td>3'</td>
<td>7</td>
</tr>
</tbody>
</table>

**TYPE D INLET**

**STANDARD SHEET D90-D**
CONCRETE AND REINFORCING STEEL QUANTITIES

| No. | Bore (Bar) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) | Bore (Straight) |
|-----|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 4   | 5.17       | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            | 5.17            |
| 5   | 5.74       | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            | 5.74            |
| 6   | 6.34       | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            | 6.34            |

* The quantities shown above are for an 8’ length of pipe. If shorter lengths are required, the quantities must be adjusted accordingly. The above table is to be used for estimating purposes only.
CONSTRUCTION JOINT DETAILS

NOTES

The final installed top surface of inlet and grate shall be flush with adjacent finished surfaces such as pavement, gutters, curbs, and sidewalks, top of grate elevation. If shown on the plans, it is for information only.

Construction may be cast-in-place, precast in one or multiple sections, or any combination of cast-in-place and precast.

Optionally, construction joints labeled C1 may be roughened concrete, keyed or dowelled as per the typical detail, shown herein or as approved by the Engineer. Non-filing grouts meeting the requirements of subsection 115.5 of the specifications may be used in a depth of 1/2" for leveling between precast sections. Thicker depths will be allowed if per the manufacturer’s recommendations.

The covering for reinforcing steel shall be two inches, measured from the surface of the concrete to the face of the bar, unless otherwise shown.

For details of grates (two required), see Inlet Coatings Standard Sheet D90-94.

PC interceptor pipe cover shall be 12" below inlet top for pipes placed under sidewalk or grassed area or 24" below inlet top for pipes placed under pavement or shoulder.

Curbs, if specified, may be either concrete placed on the inlet backwall as detailed herein or an approved curb box as manufactured with the grate and frame. Dimensions of the curb box should reasonably conform to the standard curb as specified on the plans. The curb will be held for per section 810.2 in either case.

Tets inlet shall not be placed in a pedestrian crosswalk.

The minimum distance from the top of any pipe opening to any construction joint above the opening shall be four (4) inches.

The number and location of pipe openings shall be as shown in the plans. The contractor shall be responsible for any temporary bridging required to transport precast inlet sections due to multiple openings.
The final installed top surface of inlet and grate shall be flush with adjacent finished surfaces such as pavement, gutters, curbs, and sidewalks. Top of grate elevation, if shown on the plans, is for information only.

Construction may be cost-in-place, precast in one or multiple sections, or any combination of cost-in-place and precast.

Type 2 Grate shall be used at locations unless otherwise specified on the Plans. Type 1 Urban Grates shall be used only at specially designated locations as shown on the Plans.

The Contractor, at his option, may omit use of the frame by forming a ledge in the concrete.

Special care shall be exercised in forming the 2" wide concrete ledge to provide a smooth, even surface for supporting the grates if the shallow frame is not used. No projections shall exist on the bearing surfaces of the ledge or the grates, and the grates shall seat on the ledge without rocking.

The Mounding Detials shown is not required when an inlet is placed in a bog.

Optional construction joints labeled C1 may be roughened concrete, keyed or dowelled as per the typical details shown herein or as approved by the Engineer. Non-shrink grout meeting the requirements of subsection 715.5 of the specifications may be used to a depth of $\frac{1}{2}$" for leveling between precast sections. Thicker depths will be allowed as per the manufacturer's recommendations.

This inlet is to be installed in roadside or median ditches only. It is not to be placed adjacent to pavement or in the gutter of a combination curb and gutter.

The minimum distance from the top of any pipe opening to any construction joint above the opening shall be four (4) inches.

The number and location of pipe openings shall be as shown on the Plans. The contractor at no additional cost shall be responsible for any temporary bracing required to transport precast inlet sections due to multiple openings.

Table Note: Gate and frame weights are for information only and will increase if larger straps and bars are used. The following substitutions in dimensions are acceptable for fabricating the gate and frame:

<table>
<thead>
<tr>
<th>Strap Thickness</th>
<th>Strap Depth</th>
<th>Bar Depth</th>
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<tbody>
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<td>1/2&quot;</td>
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<td>3&quot;</td>
</tr>
</tbody>
</table>

**CONSTRUCTION JOINT DETAILS**

**NOTES**

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

STANDARD SHEET DRG-G
1/2" Expansion Joint Material
(when abutting concrete pavement)

PLAN
(Grate not shown)

SECTION A-A
Pipe size, type, and locations as specified on the plans

SECTION B-B

Type V or VI Median as specified on the plans

NOTES

The final installed top surface of inlet and grate shall be flush with adjacent finished surfaces such as pavement, gutters, curbs, and sidewalks. Top of grate elevation, if shown on the plans, is for information only.

Construction may be cast-in-place, precast in one or multiple sections, or any combination of cast-in-place and precast.

This inlet is intended for use with Type V and VI medians (concrete barrier medians) as specified on the plans.

Curb flowline

Pavement or Curb

C1

C2

C3

C4

C5

Pipe size, type, and locations as specified on the plans

Median Face

SECTION D-D

Ribs Optional

SECTION E-E

CONSTRUCTION JOINT DETAILS

3"MIN.
2"MIN.
3"MIN.
2"MIN.
3"MIN.
2"MIN.

The final installed top surface of inlet and grate shall be flush with adjacent finished surfaces such as pavement, gutters, curbs, and sidewalks. Top of grate elevation, if shown on the plans, is for information only.

Construction may be cast-in-place, precast in one or multiple sections, or any combination of cast-in-place and precast.

This inlet is intended for use with Type V and VI medians (concrete barrier medians) as specified on the plans.

Optional construction joints labeled "C" may be roughened concrete, keyed or dowelled as per the typical material shown herein or as approved by the Engineer. Non-shrink grout meeting the requirements of subsection 715.5 of the specifications may be used to a depth of 1/2" for leveling between precast sections. Thicker depths will be allowed as per the manufacturer's recommendations. 

Grate as shown on Standard Sheet DRI-11 to be used with this inlet.

PC (Minimum pipe cover) shall be 12" below inlet top for pipes placed under sidewalk or grassed area or 24" below inlet top for pipes placed under pavement or shoulder.

This inlet shall not be placed in a pedestrian crosswalk.

The minimum distance from the top of any pipe opening to any construction joint above the opening shall be four (4) inches.

The number and location of pipe openings shall be as shown in the plans. The contractor and/or local authorities shall be responsible for any temporary bracing required to transport precast inlet sections due to multiple openings.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
COUNTY OF SOUTHERN

STANDARD SHEET DRI-11

TYPE H INLET
NOTES

Type A Manholes, when specified on the plans, may be constructed in either the cast-in-place or precast option as shown herein.

Steps, frames, and covers shall be as shown on Standard Sheet DRI-4.

"Keyed" or "dowled" type construction joints, acceptable to the Engineer, may be used in the construction of concrete manholes.

If the cast-in-place manhole is over twelve feet (12') in depth, the sidewalk below that depth will be double thickness.

Pipe at elevations other than shown may be joined to the manhole by cutting a hole the size of the connecting pipe in the manhole. Inserting the pipe the thickness of the manhole shell and closing all openings around the connecting pipe with joint mortar.

Drawing shows pipe entering and leaving manhole in a straight line. However, the pipes may enter or leave at an angle or piece as called for or shown on the plans.

Minimum height of benchwall above flowline of pipe is 25% of the diameter of the pipes.

The use of brick for manhole construction will not be allowed when a manhole is located in the roadway.

The following additional notes are applicable for precast manholes:

Manhole steps shall be placed into plastic concrete wall during manufacture or mortared into holes after the concrete has set.

Sidewalk sections may be used in any combination to produce a manhole of desired depth, except the toped top section shall be retained as shown.

The toped top section shall be manufactured and meet the same requirements as the manhole's sidewall, but shall conform to the dimensions detailed herein.

Lifting holes in the toped top section and the circumferential notches in the manhole cover are for handling purposes only.

The precast sidewalk units shall be set in joint mortar or sealed with O-ring gaskets.
COMPLETE STRUCTURE

SECTION THROUGH FOOTER

PLAN VIEWS

SECTION B-B

CONCRETE BASE
Optional Precast Or Field-cast
(For Use With Storm Sewers Only)

NOTES
"Keyed" Or "Dowled" Type Construction Joints, Acceptable To
The Engineer, May Be Used In The Construction Of Concrete Manholes.
If Cast-In-Place Manhole Is Over Twelve Feet (12') In Depth.
The Sidewalls Below That Depth Will Be Double Thickness.

Pipe At Elevations Other Than Shown May Be Jointed To The
Manhole By Cutting A Hole In The Side Of The Connecting Pipe In
The Manhole, Inserting The Pipe, The Thickness Of The Manhole Shell
And Covering All Openings Around The Connecting Pipe With Joint
Mortar.

Either This Manhole Or The Precast Manhole On Standard Sheet
DRT-A May Be Furnished When Type B Manhole Is Called For In The
Contract. The Frame And Grate Shell Be As Shown On Standard
Sheet DRT-X. Inlet Castings, Steps Shall Be As Shown On Standard
Sheet DRT-X.

Minimum Height Of Bench Wall Above Flowline Of Pipe Is
25% Of The Diameter Of The Pipe.

The use of brick for manhole construction will not be allowed when
a manhole is located in the roadway.
NOTES

 Listening on covers shall denote STORM SEWER or SANITARY SEWER as applicable.
 Bottom ring may be deleted from manhole cover castings.
 The 1/8" raised tags are a skid resistant measure. Alternative measures will require approval by the Engineer.
 Shop Drawings shall be submitted if details and dimensions vary.

 REINFORCED PLASTIC AND REINFORCED - CORROSION RESISTANT RUBBER MANHOLE STEPS
Except for installations of pipe where length of bedding is not exceed width of
bottom hole. However, if structural plate pipe is first assembled
and then placed in the trench, the 0.15 x 0.06 minimum under-drain:

Compacted Backfill

Fine Aggregate
for Leveling

Class B Bedding

(Adapted for 18" thru 54" Pipe)

Compacted Crushed Aggregate
Backfill

Fine Aggregate
for Leveling

Granular
Material

Class B Bedding

On Rock Foundation

(Adapted for 60" thru 108" flexible pipe in soil cut sections)

Compacted Backfill

Fine Aggregate
for Leveling

Class B Bedding

(Adapted for 60" thru 108" rigid pipe in cut sections)

Class B Bedding

On Rock Foundation

(Adapted for 18" thru 54" Pipe)

MEDIAN OUTLET IN HIGH FILL

To be used where called for on the plans or as shown on the cross sections.

Compacted Backfill

Fine Aggregate
for Leveling

Class B Bedding

On Rock Foundation

Notes

For pipe without corrugations, a one inch layer of
fine aggregate for leveling will normally be adequate

Class B Bedding

On Rock Foundation

OUTLET THROUGH BERM

To be used where called for on the plans or as shown on the cross sections.

Pipe Flume

Earth Cut or Shallow
Rock Cuts

(Adapted for 60" thru 108" rigid pipe in cut sections)

TYPICAL PIPE BEDDING
NOTES

Payment for the outlet pipe includes drop connections in the free draining base trench and slopewalls or connections to drainage structures as required. Maximum outlet spacing is to be 250' in embankments. Outlets in cut sections will be made to the nearest drainage structure. Slopewall details will be in accordance with Standard DBB (sheet 3 of 4). At vertical cuts, one outlet shall be constructed at the low point and additional outlets shall be constructed at 25 feet and 50 feet each way from the low point.

Underdrain pipes shall be detailed to be 6" diameter non-perforated rigid pipe except for the 5' of pipe placed in the free draining base trench unless otherwise specified in the plans.

All outlets are to be equipped with a Slopewall for Underdrain and Varmint Screen as detailed. Slopewalls will not be paid for separately but shall be included in the cost of the underdrain pipe. Underdrain pipes will be fitted or fastened to culvert pipe by pipe saddle, grouting, cementing, or other means that will provide a secure attachment satisfactory to the engineer shall be included in the cost of the underdrain pipe.

Commercially available galvanized hardware screen is to be snugly fitted inside each Slopewall. The screen is to have the capability of being removed and reinstalled for maintenance operations. The screen wires shall be welded at a spacing in each direction of 3" to 5/8" of the cost of the screen to be included in the cost of the underdrain pipe or edge drain.

Crossovers shall have outlets coordinated with regular roadway outlets to ensure that outlets shall be free draining.

Typical lateral trench sections shown are possible selections, other configurations may be utilized if depth and width are obtained. Spacing shall be 100' maximum in areas designated as requiring lateral trench.

Lateral trench sections shall be installed at locations as follows:
- Cross Slope: 0.0156/ Grade: 4% and above
- Cross Slope: 0.0208/ Grade: 5% and above
- Cross Slope: 0.0400/ Grade: 8% and above
- Cross Slope: 0.0500/ and greater no trench required
Filter fabric and aggregate for filter fabric underdrain shall conform to the requirements of Section 606.2 of the Specifications. All coats associated with the 5" perforated underdrain pipe required in the Filter Fabric Underdrain Installation to be included in the contract price bid for Filter Fabric Underdrain.

Underdrain shall generally follow the grade of the pavement where the grade is not less than 1%. A desirable minimum of 1% and an absolute minimum of 0.2% with 18" of cover shall control the placement of Underdrain unless otherwise noted on the plans.

The top of the underdrain pipe shall be placed at the same elevation as the top of the outlet pipe of all inlets or manholes unless otherwise noted on the plans.

Spring Control shall be used where noted on the plans or as directed by the Engineer. Cost of excavation, filter fabric and installation shall be included in the contract price bid for "Crushed Stone, Crushed Gravel, or Silica Sand for Underdrain." Elevations as indicated shall be as shown on the plans or determined in the field.

For pipe cap details, see Standard Sheet DRB 3.3 or 4.

All Underdrain outlets are to be equipped with a Sluiceway for Underdrain and Varmint Screen as detailed on Standard Sheet DRB 3.3 or 4 or tied to existing inlets or culvert pipes. Sluiceway for underdrain will not be paid for separately but shall be included in the cost of the Underdrain pipe or Filter Fabric Underdrain. Underdrain pipe tied to fishtails or fastened to culvert pipe by pipe saddle, grousing, cementing, or other means that will provide a secure attachment satisfactory to Engineer shall be included in the cost of the Underdrain pipe or Filter Fabric Underdrain.
1. The type of backfill and repaving of trenches under existing pavement shall be as specified in the plans. If no type is specified, the applicable detail shall be used. When a Type F Trench is specified under an existing roadway, repaving of the pavement section shall be per the applicable detail on this sheet.

2. Asphalt thickness shown here are in addition to any resurfacing which may be included in the project. Trench to be completed before resurfacing.

3. 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 unit price of pipe and stone to meet requirements of Section 307 Class I.

4. Payment for asphalt to be in tons of material specified for the project. Such items are not specified cost is to be included in unit price of pipe. Asphalt base or patching and leveling may be used.

5. Cost of all labor, materials, and equipment required 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.

6. Where type A trenches are wider than 7' in existing bituminous pavement, concrete may be deleted if existing asphalt thickness and 12" stone are restored.

7. 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 trench, is required to prevent wheel loads from being transmitted to the CLSM or concrete. 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 50% of its compressive strength. Cost of such plates is to be included in the unit price bid for pipe.

8. Concrete surface to be rough for bonding of asphalt if area is to be resurfaced. Trench to be completed before resurfacing.

9. Testing of steel bars & dowels is waived; however the Engineer must verify dimensions.

10. Concrete shall be constructed in accordance with Section 501 except that testing is waived if from a Certified Supplier.

11. Dowel bars are to be coated in accordance with Section 709.15 of the specifications.

NOTES:

1. The type of backfill and repaving of trenches under existing pavement shall be as specified in the plans. If no type is specified, the applicable detail shall be used. When a Type F Trench is specified under an existing roadway, repaving of the pavement section shall be per the applicable detail on this sheet.

2. Asphalt thickness shown here are in addition to any resurfacing which may be included in the project. Trench to be completed before resurfacing.

3. 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 unit price of pipe and stone to meet requirements of Section 307 Class I.

4. Payment for asphalt to be in tons of material specified for the project. Such items are not specified cost is to be included in unit price of pipe. Asphalt base or patching and leveling may be used.

5. Cost of all labor, materials, and equipment required 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.

6. Where type A trenches are wider than 7' in existing bituminous pavement, concrete may be deleted if existing asphalt thickness and 12" stone are restored.

7. 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 trench, is required to prevent wheel loads from being transmitted to the CLSM or concrete. 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 50% of its compressive strength. Cost of such plates is to be included in the unit price bid for pipe.

8. Concrete surface to be rough for bonding of asphalt if area is to be resurfaced. Trench to be completed before resurfacing.

9. Testing of steel bars & dowels is waived; however the Engineer must verify dimensions.

10. Concrete shall be constructed in accordance with Section 501 except that testing is waived if from a Certified Supplier.

11. Dowel bars are to be coated in accordance with Section 709.15 of the specifications.
**TYPE F DRAINAGE PIPE TRENCH**

**CONCRETE COLLAR DETAIL**

<table>
<thead>
<tr>
<th>DIAMETER OF PIPE</th>
<th>A</th>
<th>B</th>
<th>CU. YD. CONC.</th>
<th>DIAMETER OF PIPE</th>
<th>A</th>
<th>B</th>
<th>CU. YD. CONC.</th>
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<tr>
<td>15&quot;</td>
<td>1'-0&quot;</td>
<td>0'-6&quot;</td>
<td>0.18</td>
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<tr>
<td>18&quot;</td>
<td>1'-0&quot;</td>
<td>0'-6&quot;</td>
<td>0.21</td>
<td>54&quot;</td>
<td>2'-6&quot;</td>
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<td>108&quot;</td>
<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
<td>9.87</td>
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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 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.

**NOTES:**
- CLSM = Controlled Low Strength Material
- This detail shall be used on proposed pipes / culverts when specified on the plans. The cost of the Type F trench is incidental to the pipe / culvert.

If Type F trench is used where there is no existing or proposed inlet, the CLSM shall be poured full depth 2' past each edge of pavement. The pipe shall be encased in 4" of CLSM an additional 10' max. beyond edge of pavement. If there is an existing or proposed inlet the CLSM shall be poured full depth to the inlet.
GUARDRAIL HEIGHT

Transitions in guardrail height shall be accomplished at a rate of 1" vertical distance in 12.5" linear distance. Height transitions shall be before and between sections or connections begin.

Height transitions between 28 1/2" and 31" require moving the splice or end of the post by placing one additional post at half the nominal spacing.

Guardrail height shall be as indicated on plans. Transition tolerances for road height is plus/minus 1".

The standard grading treatment is acceptable for both 28 1/2" and 31" guardrail heights. Approach Termination-Separate approved product lists will be maintained for both 28 1/2" and 31" transition heights.

Guardrail shall be cut to fit. Terminal sections shall be provided per standard details. The height of the CTS shall be determined by the height of the CST.

The beam transitions shall be per Standard GR-4 dated 10-13-12 for 28 1/2" and dated 11-21-12 for 31".

NOTES

Guardrail systems on I-95 routes must meet NCHRP 252 or the most current AASHTO Manual for Accessory Safety Hardware & Safety Crash Tests Testing Criteria and have an eligibility letter to be used on WVDOT projects.

Guardrail shall be used to the blocks, post and other elements by 5/8" dial bolts and nuts conforming to the details herein and to the requirements of TGL-A of the Standard Specifications. Nuts shall conform to ASTM A453, Grade A or better.

Approach and Termination Treatments shall be as shown or specified on the Plans or directed by the Engineer.

The post quantity of guardrail will be the linear feet of guardrail measured along the face of the road from center to center of guardrail post. Cost of the Terminal Section Buffer End shall be included in the cost of the Guardrail.

The approach slope of the face of the guardrail shall be 10:1 or flatter.

The Top, Class and Height of Guardrail shall be as shown on the Plans, Laid Guardrail in Direction of Traffic.
NOTES

The blocks shall be bolted to the steel posts in the same manner when the beams are at the same elevation as they would when the beams are at different elevations.

The standard bolt shall be used for wood guardrail post when possible.

The applicable details and notes of Standard Sheet GR2 shall apply to this sheet.

* Round Wood Posts shall not be used on WVDOH Projects after 12-31-2017.
NOTES

1. FOR FILL TO CUT GUARDRAIL TERMINALS - TRAILING END, THE LINE WIDTHS, AND ALL ATTACHAGE END WHERE IMPROVED ENDS ARE SPECIFIED, THE DETAILS AND REQUIREMENT NOTES SHALL BE APPLICABLE.

2. PRIOR TO PLACING GUARDRAIL, A FINAL CHECK OF EXISTING CONDITIONS WILL BE MADE BY THE ENGINEER AND ANY ADJUSTMENT NECESSARY TO INSURE THE PROPER LOCATION AND FUNCTIONING OF THE GUARDRAIL FOR THE PURPOSE FOR WHICH IT IS INSTALLED WILL BE MADE ACCORDINGLY.

3. POSTS, BLOCKS AND RAIL ELEMENTS SHALL BE THE SAME TYPE USED IN THE NORMAL GUARDRAIL INSTALLATION, UNLESS OTHERWISE NOTED. GUARDRAIL BLOCKS SHALL NOT BE INSTALLED ON ANY POSTS COMPLETELY UNDERGROUND.

4. THE FINAL DECISION AS TO THE TYPE OF CUT SLOPE TERMINAL INSTALLATION (TYPE A OR B) AT EACH LOCATION WILL BE BASED ON THE ACTUAL MATERIALS ENCOUNTERED DURING CONSTRUCTION. THEGUARDRAIL BLOCK IS 18" MAX. TAPER 31" GUARDRAIL DOWN VERTICALLY PRIOR TO CST INSTALLATION. THE CST SHALL BE INSTALLED AT 28-1/2" HEIGHT.

5. CUT SLOPE TERMINAL INSTALLATION CAN INTERFERE WITH NORMAL DRAINAGE THROUGH A CUT SECTION. WHEN THIS OCCURS, DETAILS FOR MAINTAINING POSITIVE DRAINAGE WILL BE SHOWN ON THE PROJECT PLANS.

6. WHEN INSTALLING CST TERMINAL INTO 31" TOP OF RAIL HEIGHT GUARDRAIL, THE CST SHALL BE INSTALLED AT 28-1/2" HEIGHT, TAPER 31" GUARDRAIL DOWN VERTICALLY PRIOR TO CST INSTALLATION.

7. THE CUT GUARDRAIL TERMINAL SHOULD BE USED ONLY WITH CST OR STEEPER BACK SLOPE.

8. THE FLARE RATE OF THE GUARDRAIL MAY BE STEEPENED TO 8:1 AFTER CROSSING AT A MINIMUM.

9. RUBRAIL TO EXTEND FROM POST 2, THROUGH ENTIRETY OF DITCH, TO POST 22.

10. FOR THE RUBRAIL SECTION USE 8' LONG POSTS.

11. SEE GR-4A AND GR-4B FOR DETAILS OF TYPE A AND TYPE B TERMINALS.

12. MAXIMUM CLEARANCE FROM BOTTOM OF W-BEAM TO GROUND LINE NEARLY H-BEAM RUBRAIL IS 18".
SEE NOTE 3, 4 & 5 THREADED ANCHOR RODS.

FOUR 7/8 INCH DIA. X 10 INCH HEAVY DUTY GALVANIZED THREADED ANCHOR RODS.
ATTACH TRANSITION CONNECTION WITH HEX HEAD RECESSED NUTS AND SQUARE PLATE WASHERS.

FIELD DRILL THREE 1" DIA. HOLES IN W-BEAM AND ATTACH WITH 5/8 INCH X 1 1/2 INCH LONG HEX BOLT WITH A SQUARE WASHER AND HEX NUT. SEE NOTE 2.

FIELD DRILL ONE 1 1/2" DIA. HOLE IN WASAM AND POST FLANGE AND ATTACH WITH 5/8 INCH X 2 INCH LONG HEX SOLT WITH A SQUARE WASHER AND HEX NUT. SEE NOTE 2.

NOTES:
1. USE CLASS B CONCRETE.
2. USE EPOXY COATED REINFORCING STEEL, PER SECTION 602 OF THE SPECIFICATIONS.
3. USE GALVANIZED THREADED ROD.
4. THREADED RODS CAN BE CAST INTO CONCRETE BLOCK OR HOLES CAN BE DRILLED INTO BLOCK AND RODS ANCHORED WITH EPOXY.
5. DRILL HOLES A MINIMUM 6 INCH DEEP, CLEAN DRILLED HOLES PRIOR TO INSERTING THREADED ROD.

NOTED:
1. USE 1/2 INCH STEEL PLATE MEETING REQUIREMENTS OF ASTM A 36.
2. GALVANIZING REQUIRED FOR PLATE AND HARDWARE.
3. USE ZINC RICH PAINT TO COAT FIELD DRILLED HOLES.

GENERAL NOTES:
TYPE A (SOFT SHALE OR SOIL) CUT SLOPE TERMINAL GUARDRAIL SHALL BE THAT GUARDRAIL WHICH IS TO EXTEND A MINIMUM OF TWO 6'-3" SPANS INTO THE CUT SLOPE, FROM THE FIRST POST BEYOND THE TOE OF THE CUT SLOPE AND IS TO TERMINATE A MINIMUM OF 1'-0" BELOW THE GROUND ELEVATION OF THE BACK SLOPE, EXCEPT IN AREAS OF HEAVY ROCK OUTCROPPING WHERE THE MINIMUM DEPTH MAY BE 6 INCHES.

TRENCH NO GREATER THAN 18" IN WIDTH SHALL BE EXCAVATED INTO THE CUT SLOPE TO ACCOMMODATE THE TYPE A TERMINAL INSTALLATION. THE CONTRACTOR SHALL ARRANGE AND WORK SEQUENCE SUCH THAT EACH TYPE A CUT SLOPE TERMINAL INSTALLATION BE (EXCAVATED), POSTS DRIVEN, RAIL ELEMENTS AND GUARDRAIL COMPONENTS ASSEMBLED, TRENCH BACKFILLED, AND DISTURBED SLOPE SHAPED, SEEDED AND MULCHED ALL IN A CONTINUOUS OPERATION.

CONCRETE BLOCK

STEEL POSTS AND PLATES

STEEL POST WITH PLATE AND WOOD BLOCK

OPTION I

CONCRETE BLOCK

OPTION II

STEEL POSTS AND PLATES

STEEL POST WITH PLATE AND WOOD BLOCK

RUBRAIL ELEMENT

RUBRAIL ELEMENT

W6 x 8.5 STEEL POST

W6 x 8.5 STEEL POST

SQUARE WASHER

(3/16 INCH THICK, GALVANIZED)

1/2 INCH STEEL PLATE

(GALVANIZED)

ANCHOR POST/PLATE ATTACHMENT FOR SINGLE RAIL ELEMENT

ANCHOR POST/PLATE ATTACHMENT FOR RUB RAIL ELEMENT

GENERAL NOTES:

W6 x 8.5 STEEL POST

(3/16 INCH THICK, GALVANIZED)

SQUARE WASHER

(3/16 INCH THICK, GALVANIZED)

1/2 INCH STEEL PLATE

(GALVANIZED)
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.

Guardsrail End Shoe Detail

Guardrail End Shoe

Neutal Axis

3 3/8" x 3/4" Hole

3 3/8" x 3/4" Hole

3 1/2"

2 1/2"

2 1/2"

2 1/2"

2 1/2"

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PARABOLIC LAYOUT PLAN

NOTES

For details of Flared End Terminals see approved shop drawings.

All materials used shall meet the applicable requirements of Section 607 of the Standard Specifications Road and Bridges.

The post offset dimensions are given to the center of the traffic face of the blockout except at the flared post, where the dimension is to the center of the traffic face of the post. Offset points are to be located by measurements of the back of rail equal to the nominal post spacing shown on approved shop drawings. Posts are to be set approximately parallel to the rails at each location.

Where a wood block is used adjacent to a wood post, the block should be mated to the post with a galvanized steel / common nail. The nails to be driven into the center of the top or bottom of the block.

The cost of furnishing and installing the Flared End Terminal, complete with miscellaneous hardware and parts as detailed in the approved shop drawings, is to be included in the unit price bid for "Flared End Terminal".

Yellow reflective sheeting shall cover the entire nose of these terminals with a flat impact head. These terminals with a rounded impact shall be covered with a 1/8" x 3/0" yellow reflective sheet.

As of 1/15/12 revision date, the detail is obsolete and no longer used for new construction.
NOTES

Flared End Terminal shall meet NCHRP-350 and/or wash testing for appropriate height.

Separate Approved Product Lists will be maintained for both 28 1/2" and 21" terminal heights.

For details of Flared End Terminal see pre-approved shop drawings.

Post and splice locations are per manufacturer.

All materials used shall meet the applicable requirements of Section 507 of the Standard Specifications for Roads and Bridges.

The post offset dimensions are given in the center of the face of the block, except at the first post, where the dimension is to the center of the face of the post. Offset plates are to be located by measurements to the center of the block and not to the nominal size shown on pre-approved shop drawings. Posts are to be set approximately equal to the ruling at each location.

When a wood block is used adjacent to a wood post, the block shall be nailed to the post with a galvanized steel 6d common nail. The nails to be driven into the center of the top or bottom of the block.

The cost of furnishing and installing the Flared End Terminal, complete with all miscellaneous hardware and parts as decided on the pre-approved shop drawings, is to be included in the unit price bid for "Flared End Terminal".

Yellow reflective sheeting shall cover the entire rear of those terminals with a list impact head. These terminals with a rounded impact head shall be covered with a 1" x 3" x 0" yellow reflective sheet.
Steel tubes shall meet the requirements of ASTM Specification A500, Grade B, and shall be hot-dipped after fabrication according with the requirements of AASHTO Specification W150. Other terminal components, such as anchor plates, cable assemblies, hardware, plates, pipe sleeves, etc., shall conform to the detail and requirements of section 607 of the Specifications.

For each STET 1 and treatment installations, it shall be the Contractor's option whether to utilize the Tubular Steel End Foundation design detailed herein or Concrete Post-End Foundation design detailed herein. Concrete Post-End Foundation shall be specified in the plans. When the Concrete Post-End Foundation is used, the radii portion of the Endpost shall be double wrapped with Composition Paper, or single wrapped with sheet metal or other material acceptable to the Engineer before concrete placement to facilitate replacement of damaged posts.

The cost of furnishing and installing the Special Trailing End Terminal, including structural tubing, bolt plates, and welded bearing plates for Tubular Steel End Foundations; concrete post-ends with or without concrete to necessary excavation, compaction paper and sheet metal for Concrete Post-End Foundations; and all "terminal" hardware, cables, cable splices, and pipe sleeves shall be included in the unit price bid for "Special Trailing End Terminal," per each. Normal gusset components, i.e., posts, blocks, rail elements, hardware, etc., along with the special saddle and special length wood guardrail end post, and the horizontal section bar end post shall be paid for as gusseted per linear foot.
These guardrail transitions are appropriate for connection to a vertical concrete shape and should not be connected directly to a concrete roadway shape. Concrete roadway shapes bridge rails or barriers shall be transitioned to a vertical shape at the guardrail connection in a manner detailed elsewhere on the Project Plans.

Although these details may appear to guardrail-to-bridge transitions and connections, they actually apply to guardrail transitions and connections to concrete barriers, concrete rigid walls or other structures as specified and detailed on the Project Plans.

These details are not required for transitioning guardrails to a bridge when the guardrail is located on the hi-lining and at a divided highway bridge. Normal guardrail details shall apply.

Installation shall be performed in such a manner as to maintain the roadway line (top w-beam parallel to the roadway centerline throughout the length of the 18'-9" transition for both designs. Posts A, B, C, and D require an additional hole to attach bottom blocks and bottom beams. For wood design, the bottom beam wood blocks are centered and attached with 3/8" diameter bolts. For steel post design, the bottom beam wood blocks shall be offset drilled to sit squarely on the post flange and attached with 1/4" diameter bolts.

The outside post and blocks shall be bolted to the top rail elements however, posts and blocks shall be bolted and securely fastened to provide firm contact of the blocks against the top rails of these posts.

All holes in struts shall be fabricated.

All these details are for transitioning 6" post spacing guardrail to a vertical concrete shape when transitioning 12" post spacing guardrail is a vertical concrete shape, the 25 of 35 post shall be replaced with 6" post spacing.

There is no separate pay item for the connection and all components are detailed herein included in the contract price for guardrail.
NOTES

1. This guardrail transition is appropriate for connection to a concrete safety shape.

2. Bridge rail ends and bridge parapets must be of adequate strength to accept 11 kip impact loading.

3. Rubrail-wood blocks, located on posts 1 through 4 are centered and secured with 3/8" carriage bolts.

4. Posts 1 through 5 require on additional hole to attach lower blocks and/or lower rubrail.

5. W-beam is bolted to posts and blocks at posts 2, 3, 4, 6, and 8. Blocks are bolted directly to posts.

6. Steelspacers tube, schedule 40 galvanized pipe, 5" (ID) x 8", attached with a 3/8" carriage bolt and rectangular plate washer.

7. See Sheet 3 of 3 for detail. Block is attached by a 3/8" x 3" bolt.

8. There is no separate pay item for the connection and will be included in the contract price for guardrail.

GUARDRAIL END SHOE DETAIL

SCALE: 1" = 1'-0"
NOTES

1. Rubrail end must be attached flush with sloping toe of safety shape. Installation can be greatly simplified by fabricating or shop twisting the rubrail end to be consistent with the toe of safety shape. Rubrail ends twisted both clockwise and counterclockwise may be required in most situations.

2. The rubrail attachment to the concrete safety shape requires three closely fitted holes. Appropriately sized bolt anchors should be used to reduce the risk of splitting the concrete.

3. There are no separate pay items for this connection and all components are detailed herein shall be included in the contract price for guardrail.

W. V. DEPARTMENT OF TRANSPORTATION
W-BEAM TRANSITION TO SAFETY SHAPE RUBRAIL DETAILS SHEET 3 OF 3
W-3013/10/01 STANDARD SHEET GRID
This guardrail transition is appropriate for connection to a vertical concrete shape and should not be connected directly to a concrete safety shape. Concrete safety shape bridge rails or barriers shall be transitioned to a vertical shape at the guardrail connection in a manner detailed elsewhere in the Project Plans.

The two sections of 12'6" thrie beam require additional holes in order to mount the beam to the post nearest to the concrete wall.

Guardrail systems must have met either the NCHRP 350 or the most current AASHTO Manual for Assessing Safety Hardware (MASH) crash testing criteria and have an FMHH eligibility letter to be used on WVDOH projects. Only FHWA approved guardrail systems utilizing wood or approved block-outs shown on the Division's "Approved Source/Product Listing" shall be used. Steel "W" Shapes shall not be used for block-outs. Only one type of block shall be used for block-outs throughout any project, unless otherwise specified.
NOTES

The median and barrier can be poured monolithically when the median is poured on existing concrete pavement. The median structure should be designed and graded into the existing concrete pavement as shown.

When the median and barrier are to be poured separately, a median construction joint must be used.

Where the median is placed over existing pavement construction joints, median sections shall be separated by open joints having the same width as the pavement joints for the full length of the median.

Where median construction joints are to be formed in the median, the median shall be constructed in one or more sections as shown on the Plans or as directed by the Engineer. At expansion joints, median sections where 3/4" transverse expansion joints shall be located shall be separated by 3/4" transverse expansion joints shall be located.

Where the median is placed over existing pavement construction joints, expansion joints shall be placed in the median as structures when so indicated, opposite expansion joints in existing concrete pavement, over existing expansion joints in underlying concrete pavement, and at other locations as shown on the Plans or as directed by the Engineer. At expansion joints, median sections where 3/4" transverse expansion joints shall be located shall be separated by 3/4" transverse expansion joints shall be located.

The median structure shall be terminated at each end of median installations as shown or specified elsewhere in the Plans.

Drainage openings shall be provided in the median where indicated on the Plans or as directed by the Engineer.

Unless otherwise specified in the Plans or as directed by the Engineer, where concentration of loads is shown or specified in the Plans or as directed by the Engineer, the F-Shape shall be used.

For additional dimensions, notes and details see sheet 2 and 3.
(Adjacent to Bituminous Paving)

N-J SHAPE

(Adjacent to Concrete Paving)

NOTES

Height of the median, dimension "h", shall be included in the Plan.
Additional height of median, dimension "h" shall be per vertical.
The contractor shall have the option to install either the N-J Shape or the F-Shape median unless otherwise specified in the Plans.

For additional dimensions, notes and details, see Sheet 1 and 3.

The following table provides the thicknesses for the various materials:

<table>
<thead>
<tr>
<th>N-J SHAPE MATERIALS</th>
<th>Standard</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
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<tr>
<td>Steel</td>
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<tr>
<td>Asphalt</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Median Finish</td>
<td>2&quot;</td>
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</tbody>
</table>

TYPE V MEDIAN
N-J SHAPE

(Sheet 2 of 4)

STANDARD SHEET 0102

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY

STANDARD DETAIL

GR 12

Standard Detail GR 12 dated 7-1-99 shall not be used on WVDOH Projects let after 12-31-2017.
Standard Detail GR 12 with revision date 11-13-12 shall not be used on WVDOH Projects let after 12-31-2017.
Standard Detail GR 12 dated 7-1-99 shall not be used on WVDOH Projects after 12-31-2017.

Notes:
- Cost-in-place concrete barrier medians shall be constructed in sections as shown herein and shall be constructed in accordance with the applicable provisions of Section 610 of the Specifications.
- Barrier median contraction joints over existing pavement contraction joints, median barriers shall be protected by open joints having the same width as the pavement joints, for the full exposed depth of the median. At barrier median contraction joints, a groove 3/8" wide and 1" deep shall be sawed or milled across the top and along the sides for the entire length of the median. Full-depth butt joint shall be formed at approximately 10-20° intervals along the length of the median. In addition, these grooved or cut joints shall be covered with 3/4"x3/4" mesh within 6" or more one foot tolerance, with the contraction joints in sections.
- Expansion joints shall be placed in the barrier median at structures when so indicated, opposite expansion joints in multiple pavement segments, over existing expansion joints in underlying concrete pavement, and at other locations as shown on the Plans or directed by the Engineer. At expansion joints, barrier median sections shall be 3/4" x 3/4" and the opening filled for the entire depth of the median, with 3/8th prefried joint filler which complies with the requirements of section 610 of the Specifications. The filler shall be recessed 1/8" in from the sides and the top of the median and the completed joint shall be free of any treatment or sealant.
- The finished surface of the barrier median shall be smooth and finished flat, free of foreign objects, protrusions, and projections. The median barrier median shall be finished by the use of water and wood block or Corboration bricks.
- All ends of barrier median installations, the median shall be adequately terminated as shown or specified elsewhere in the Project Plans. Drainage openings shall be provided in the barrier medians, where indicated on the Plans or directed by the Engineer.
- Unless specifically shown, bi-directional deflectors, meeting the requirements of 610 of the Specifications and mounted on suitable supports, shall be secured to and spaced along the length of the barrier median as shown and specified on Standard Detail Sheet 10-1-5 of the Standard Detail Book, Volume II.
- The cost of concrete, steel dowels, prefried joint filler, deflectors and deflector mountings shall be included in the cost of the median.
- Type of surface adjacent to the barrier median, whether new or existing pavement, shall be terminated as shown or specified elsewhere in the Project Plans.
- The cost of barrier median but shall not be included in the cost of barrier median but shall be paid for separately.

Notes:
- A minimum of 10" of concrete pavement shall be placed on top of barrier median.
- Standard Joints shall be installed as shown.

Type VII Median
(Sheet 4 of 4)
**DETAIL FOR 18" BLOCKOUT DEPTH**

It is acceptable to use blockouts up to 16" deep to increase the post offset to avoid underground obstacles. There is no limit to the number of posts that can have additional blockouts up to 16" deep.

**DETAIL FOR 36" BLOCKOUT DEPTH**

Under special circumstances, such as avoiding obstacles that are not relocated, it is acceptable to install additional blockouts to obtain up to 36" depth for one or two consecutive posts in a section of guardrail.

Do not use 16" or 36" blockouts if it causes the post to be driven beyond shoulder hinge point or causes a fixed object to be within the deflection distance of the barrier.

**Steel Post Detail**

Section A-A

**METHODS OF REDUCING W-BEAM DEFLECTION**

- Reduce post spacing to 3'-1 1/2".
- Reduce post spacing to 1'-6 1/2".
- Double nest rail element.
- Any one stiffening method shall not exceed 25' in length.
- Any combination of stiffening methods shall not exceed 50' in length.

**Paving Around Posts**

Notes:

- Unless otherwise noted, no separate measurement or payment shall be made when details on this sheet are used. The cost associated with using these details shall be included in the appropriate guardrail pay item.
Omitting Multiple Posts for Underground Obstruction

Only those posts conflicting with the obstacle shall be eliminated. A maximum of three posts may be eliminated within 25’ span of W-Beam guardrail.
Permanent concrete barrier may be constructed in sections as shown herein and shall be constructed in accordance with the applicable provisions of Section 610 of the standard specifications.

Expansion joints shall be placed in the median barrier at 20 ft intervals along the length of the median.

The finished surface of the median barrier shall be smooth, dense, unpitted and free from air bubble pockets, depressions, and honeycomb. If deemed necessary by the engineer, the above mentioned finished surface will be obtained by the use of water and a wood block or carborundum brick.

Unless otherwise specified, bi-directional delineators, meeting the requirements of the Section 661 of the standard specifications and mounted on suitable supports shall be secured to, and spaced along the length of, median barrier as shown and specified on standard sheet TE 11-5 of the standard details book, Volume II.

Any barrier constructed for bifurcation shall maintain the slope ratio on the vertical face.
REINFORCEMENT NOTES:

SEE ACI DETAILING MANUAL FOR STANDARD HOOK DIMENSIONS. ALL DIMENSIONS ARE OUT TO OUT.

FIGURES IN CIRCLES SHOW BAR TYPES.

DIMENSION OR 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD HOOKS ARE TO BE USED.

REBAR QUANTITIES BASED ON EACH 20FT SECTION OF MEDIAN BARRIER

PREFIXES

B = BARRIER

A ANY BARRIER CONSTRUCTED FOR BIFURCATION

SHALL MAINTAIN THE SLOPE RATIO ON THE VERTICAL FACE

BAR TYPES

STANDARD SHEET   GR17
Typical Joint Layout for Concrete Pavement

NOTES
For additional details and requirements concerning joint details and joint construction, see Standard Sheet PW14.

Joint Type B may be used as an alternate to Type E joint for lanes or shoulders that are jointed with construction seams.

For additional details and requirements concerning Type E joints, see Standard Sheet PW15.

Typical Joint Layout

- **Contraction Joint Type A**
- **Construction Joint Type A**
- **Expansion Joint Type B**
- **Expansion Joint Type C**
- **Longitudinal Joint Type E**

Midwest Michigan Construction

West Virginia Department of Transportation
Division of Highways
Standard Detail

Concrete Pavement
Joint Layout
And Types

Standard Sheet PW1
TYPICAL HOOK BOLT DETAILS
TYPE E JOINTS

PAVEMENT SECTION

ALTERNATE HOOK BOLT

TRAPEZOIDAL KEY
(J Bolt Shown)

ALTERNATE (HALF-ROUND) KEY
(Alternate Hook Bolt Shown)

PAVEMENT SECTION

NOTES

Tie bolts shall meet the requirements of Section 709.7 of the Specifications.
Tie bolts shall be placed on 30” centers max.
5/8” diameter tie bars 30” long, placed longitudinally on 30” centers max., and centered across the joint or pavement edge may be used in place of the bolt assemblies.

The longitudinal tie bolt assembly for slip-form paving shall consist of one sleeve nut, one 8” long hook bolt or J bolt, and 12” long alternate hook bolt. As an initial step in installing this assembly, the 12” long alternate hook bolt, with sleeve nut attached, shall be positioned in its proper location in the pavement by appropriate slip-form paving equipment.

Typical tie bolt assemblies are shown herein. Minor variations in details and dimensional tolerances are permitted however, minimum values specified herein shall be complied with.

All tie bars and Tie Bolt Assemblies shall be epoxy coated in accordance with section 709.1 of the Standard Specifications.
NOTES

Materials and Construction for hot-mix bituminous concrete course (bridge approach expansion joint) shall be in accordance with 403 or 402 of the Specifications, as applicable. Materials and construction for the 2" hot-mix bituminous concrete and resistent overlay shall be in accordance with 402 of the Specifications.

Concrete in subbase shall be Class B or pavement concrete, meeting the requirements of 501 or 502, respectively, of the Specifications.

Bond-breaking material between concrete subbase and pavement may be bituminous material meeting the requirements of 705 or 706 of the Specifications, polyethylene sheeting, asphalt finishing paper, or other acceptable material, which will not be detrimental to the concrete.

Reinforcing steel to be used shall consist of Steel 25 and shall have a yield strength of 50,000 psi or less and shall not exceed the requirements of 709.1 of the Specifications.

The cost of the completed four-foot wide joint, including the bituminous expansion joint, shall be computed on the basis of a 100 lineal feet per joint.
MEDIAN BARRIER EXPANSION JOINT DETAILS

SECTION B-B
2" Bluminous Overlay
Concrete Curb and Gutter
Bridge Structure

SECTION D-D
Concrete Median
Concrete Curb and Gutter

SECTION A-A
Joint Thru Median
Concrete Shoulder
Concrete Subbase

SECTION C-C
Joint Thru Concrete Curb and Gutter
Concrete Shoulder

SECTION F-F
Bridge Structure
Concrete Transition Pavement

SECTION H-H
Concrete Curb and Gutter
Concrete Subbase

SECTION E-E
Joint Thru Concrete Shoulder
(With Concrete Curbage)

SECTION G-G
Joint Thru Concrete Shoulder
(Without Concrete Curbage)

SECTION J-J
Concrete Transition Pavement
Concrete Median Barrier

NOTES
The appropriate details and notes of Standard Sheet PV15 (Sheet 1 of 2) shall apply to the Standard Sheet.

The cost of the expansion joint shall be included in the cost of the concrete for each section.

The cost of forming the 15" tapered flares for the median barrier shall be included in the unit price bid for the median barrier.

Concrete shoulder, adjacent to bridge transition pavement and receiving the 2" bluminous overlay, shall be built in accordance with normal concrete shoulder construction, except as with the bridge transition pavement, the final finish requirements are waived, the concrete shoulder joints need not be sealed, the bluminous curing and/or tack coat requirement is waived, and the 15" wide strip of shoulder at the joint shall be included in the cost of the bridge expansion joint. Also, where the concrete shoulders are overlaid, the rumble strip (tiggle bar) requirements are waived.

West Virginia Department of Transportation
Standard Sheets
Bridge Approach Expansion Joint, Bridge Transition Pavement With Skid Resistant Overlay, Type J Joint (sheet 2 of 2)

2" Hot-Laid Bluminous Concrete Skid Resistant Overlay
2" Hot-Laid Bluminous Concrete Course (Base 2, Wearing, or Skid Resistant Course)
COMBINATION CONCRETE CURB AND GUTTER

INTEGRAL CONCRETE CURBING

PLAN CONCRETE CURBING

DETAILS SHOWING PLACING OF CONCRETE CURB BY SEPARATE METHODS

NOTES

For all Concrete Curbing, the face of the curbing shall be offset a minimum of two feet from the edge of traffic lane, unless otherwise shown on the Plans.

Construction of Concrete Curbing shall be by the "Separate Method" when sawed joints are constructed in the pavement.

All curb joints shall be made by acceptable forming methods.

For Combination Concrete Curbs and Gutters, the slope of the 2'-0" wide concrete gutter shall conform to the pavement slope or as otherwise specified on the Plans.
NOTES

The standard curb taper, Class I shall be used at the ends of all plain concrete curbing, unless otherwise called for on the plans.

The standard curb taper, Class I shall be used at the ends of all combination curb and gutter, and all integral concrete curbing, unless otherwise called for on the plans.

The details as shown for sidewalk and curb treatment at driveways are to be utilized unless otherwise called for on the plans.

Section B-B details additional depth of sidewalk at driveways and section B-B details standard depth sidewalk.

Sidewalk width shall be exclusive of curb width shall be 5' unless otherwise shown on plans.

Sidewalk cross slope of 2)% is absolute maximum, there is no construction tolerance for increased cross slope past 2%.

Sidewalks less than 5' in width shall have a 5' x 5' passing space at intervals of 200' or less.

SIDEWALK AND CURB TREATMENT AT DRIVEWAYS

- 6" PCC PAVEMENT OR PER DRIVEWAY TYP.
- 6" AGGREGATE BASE, 4" FREE DRAINING BASE OR PER DRIVEWAY TYP.

SIDEWALK TYPICAL

1. CONCRETE SIDEWALK ITEM 609001 S.Y.
2. BED COURSE MATERIAL ITEM 609002 C.Y.
NOTES
RAMP CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 605 OF THE SPECIFICATIONS. RAMP SURFACE SHALL INCLUDE A "DETECTABLE WARNING SURFACE": SEE FIG. 601-3, 3 OR 3A AS SHOWN FOR EACH RAMP TYPE & COMPLETE DRAWINGS TRANSVERSE TO FLARE SLICES, OR EQUAL APPROXIMATELY SHALL BE PROVIDED ON CONCRETE SURFACES.

NORMAL TOWNER FOR LINE AND PROFILE SHALL BE MOUNTED THROUGH THE RAMP AREA, UNLESS OTHERWISE SHOWN OR SPECIFIED.


EAST STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAPS. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF THE EAST STRUCTURE. WHEN MORE EXISTING STRUCTURES ARE BEING UTILIZED FOR CONSTRUCTION OF NEW RAPS.

ANY GRADE IN PEDESTRIAN AREAS SHALL HAVE OPENINGS NOT Greater THAN 1/2" AND SHALL BE PLACED WITH LONG DIMENSION OF OPENING PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

IF THE 6.33% SLOPE CANNOT BE OBTAINED DUE TO GRADES OF THE TRAFFIC WAY, THE SLOPED PORTION OF THE RAMP SHALL BE EXTENDED TO A MAXIMUM LENGTH OF 10'-0".

A TURNING SPACE AS DEFINED IN THE DETAILS SHALL BE PROVIDED AT THE TOP OF APPROPRIATE CURB RAPS. THE TURNING SPACE SHALL HAVE A MINIMUM PERM OF 8 FT. WHEN NO OBSTRUCTIONS EXIST AT THE INTERFACE OF THE TURNING SPACE, WHEN AN OBSTRUCTION EXISTS SUCH AS A BUILDING, LIGHT POLE, ETC. THE MINIMUM DIMENSION OF THE TURNING SPACE SHALL BE 5 FEET.

CURB RAPS SHALL MATCH SIDEBAND WITH PLUS CLEARANCE. TYPICAL DETAIL FOR 5" WIDE, MINIMUM 6" HIGH.

THE TYPE OF RAMP TO BE USED SHALL BE AS SPECIFIED ON THE PLANS. THE FOLLOWING CAN BE CONSIDERED GUIDELINES IN SELECTING RAMP TYPES, BUT ARE INCLUDED HERE FOR INFORMATION ONLY.

RAMP TYPES

TYPE A (10') FOR USE WHERE SIDEWALK EXTENDS TO STREET AND WHERE DETAIL 10.25" WIDE IS ACCEPTABLE FOR RAMP AND TURNING SPACE.

TYPE B (15') RAMP SHALL ONLY BE USED ON ALTERNATIVE PROJECTS WHERE THE SEPARATE CURB RAPS CANNOT BE PROVIDED. THE TYPE A RAMP IS NOT SUITABLE FOR NEW CONSTRUCTION.

TYPE C (8') PARALLEL RAMPS ARE FOR USE WHEN ACCURATE DETAIL IS NOT AVAILABLE FOR BOTH RAMPS AND TURNING SPACE CANNOT BE PROVIDED.

TYPE D (6') CURB RAMPS ARE FOR USE WHERE CURB RAMPS AS ASSEMBLY IS THE ONLY CURB RAMPS AVAILABLE. THE MARBLE发明 THE RAMP IS SET BACK FROM THE STREET AND A CURB OR LANDSCAPED RAMPS IS PROVIDED BETWEEN THE CURB AND THE STREET.

TYPE III RAPS SHOWN AT INTERSECTION

† SEPARATE PAVEMENTS

NOTE: RAMP UNDERMOUNTS ARE TO BE MOUNTED THROUGH THE RAMP AREA, UNLESS OTHERWISE SHOWN OR SPECIFIED.

FOR DETECTABLE WARNING SURFACE NOTES SEE PV 6.3 OR 6.3A.
TYPE III

Curb and gutter or plain curb

NON-WALK SURFACE

CROSSWALK

DETECTABLE WARNING

RAMP TURNING SPACE
WIDTH 5'-2" typ.

CONCRETE CURB

TYPE III A

Curb and gutter or plain curb

NON-WALK SURFACE

CROSSWALK

DETECTABLE WARNING

RAMP TURNING SPACE
WIDTH 5'-2" typ.

CONCRETE CURB

TYPE III B

DEPRESSED CURB

4'-10"

DEPRESSED CURB

DEPRESSED CURB

NON-WALK SURFACE

CROSSWALK

RAMP TURNING SPACE
WIDTH 5'-2" typ.

CONCRETE CURB

TYPE III Ramps at Intersection

1. B.S.S.Y. 12% MAX RAMP SLOPE, INCLUDING CONSTRUCTION TOLERANCE.
2. CROSS SLOPE 2.00% MAX INCLUDING CONSTRUCTION TOLERANCE.
3. Curb ramps require a 14'-0" minimum turning space with a minimum cross slope and longitudinal slope of 3.00%.

Notes:
- For detectable warning surface, see PV17 Sh1. 3 of 3.
- Curb may not be required when wall or building is present.
- Pay limits for curb ramps.

For detectable warning surface, see PV17 Sh1. 3 of 3.

Not to scale.
NOTES
THE APPROPRIATE DETAILS AND NOTES OF STANDARD SHEET PVT. SHEETS 1 AND 2 SHALL APPLY TO THIS STANDARD SHEET.

DETECTABLE WARNING SURFACES SHALL EXTEND ACROSS THE FULL WIDTH OF THE CURB RAMP, LANDING, OR TRANSITION.

CONES SHALL BE ARRANGED IN THE PREDOMINANT DIRECTION OF THE CURB RAMP.

DESIGN AND PLACEMENT OF DETECTABLE WARNING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 609 OF THE SPECIFICATIONS AND THE PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PRWAG).

SECTION

DETECTABLE WARNING SURFACE

- 1-1/8" CLEARANCE FROM JOINTS, ETC., ALL SIDES

RAMP TURNING SPACE WIDTH
5'-0" Typ.

CROSSWALK

- SIDEWALK AREA

CONCRETE CURB

- DETECTABLE WARNING SURFACE (Typ.)

- CONCRETE CURB & CURTAIN

- MIN. AREA SURFACE

TYPE IV RAMP

1. 0.33% TYP. MAX. RAMP SLOPE, INCLUDING CONSTRUCTION TOLERANCE.
2. CROSS SLOPE 2.00% MAX. INCLUDING CONSTRUCTION TOLERANCE.
3. CURB RAMPS REQUIRE A 4'-0" MINIMUM TURNING SPACE WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PREFERRED PERFORM TURNING MANEUVERS. SEE NOTE REARING ORIENTATION ON SHEET 1 AND 2 TO CURB.

PAY LIMITS FOR CURB RAMPS
GENERAL NOTES

REPAIRS SHALL BE MADE USING CONCRETE MEETING THE REQUIREMENTS OF SECTION 501 OF THE SPECIFICATIONS. CONCRETE REPAIRS SHALL BE IN ACCORDANCE WITH SUBSECTION 501A OF THE SPECIFICATIONS. A 6" MINIMUM THICKNESS OF CONCRETE SHALL BE USED. EXPANSION ANCHORS MAY REQUIRE ADDITIONAL MATERIALS TO BE PREPAID. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONCRETE REPAIRS.

Holes for the dowels and load transfer units shall be drilled through the concrete. A minimum 2" hole shall be drilled through the concrete. The minimum hole diameter shall be 1" larger for epoxy coated and 1½" for aluminum. The hole shall be a minimum of 12" deep. The hole shall be filled with a properly approved back-up material prior to the placement of the load transfer units.

CONTRACTION JOINTS SHALL BE IN ACCORDANCE WITH SECTION 501 OF THE SPECIFICATIONS. JOINTS AND DETAILS ATTACHED IN PLANS. FULL DEPTH SAW 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. OVERSAWING INTO ADJACENT SLABS WHEN ONLY ONE LANE ON PORTION OF A LANE IS TO BE REPAIRED SHALL BE KEPT TO THE MINIMUM NECESSARY TO ENSURE THAT THE CONTRACTOR IS IN A Position TO PERFORM THE REPAIRS IN A MANNER AS REQUIRED BY THE WVDOT MATERIALS CONTROL, SOILS AND TESTING DIVISION.

Payment shall be full compensation for all labor, equipment, materials, and necessary tools to properly construct the concrete repairs in accordance with the above details. Cost to be included in various items in the contract. Any additional materials required for the concrete repairs may require additional compensation. Any additional materials required for the concrete repairs may require additional compensation.

PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS, AND NECESSARY TOOLS TO PROPERLY CONSTRUCT THE CONCRETE REPAIRS IN ACCORDANCE WITH THE ABOVE DETAILS. COST TO BE INCLUDED IN VARIOUS ITEMS IN THE CONTRACT. ANY ADDITIONAL MATERIALS REQUIRED FOR THE CONCRETE REPAIRS MAY REQUIRE ADDITIONAL COMPENSATION.

SECTION A-A

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

CONCRETE REPAIR DETAIL METHOD A 6'

EXISTING TRANSVERSE JOINT

18'' MIN. OFFSET

EXISTING LONGITUDINAL JOINT

BOND BREAKER AND EXPANSION ANCHORS

DIRECTION OF TRAFFIC

SMOOTH DOWEL BARS

1/2 T-PAVEMENT THICKNESS

SMOOTH DOWEL BARS

SMOOTH DOWEL AS PER STD. DET. PVT1

EXISTING SHOULDER

EXISTING PAVEMENT

SECTION A-A

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT EVEN THOUGH ONLY ONE SIDE NEEDS REPAIR. THE TOTAL REPAIR LENGTH SHALL BE 4 FOOT.

CONCRETE REPAIR DETAIL METHOD A 4'

EXISTING TRANSVERSE JOINT

18'' MIN. OFFSET

EXISTING LONGITUDINAL JOINT

BOND BREAKER AND EXPANSION ANCHORS

DIRECTION OF TRAFFIC

SMOOTH DOWEL BARS

1/2 T-PAVEMENT THICKNESS

SMOOTH DOWEL BARS

SMOOTH DOWEL AS PER STD. DET. PVT1

EXISTING SHOULDER

EXISTING PAVEMENT

SECTION A-A

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT EVEN THOUGH ONLY ONE SIDE NEEDS REPAIR. THE TOTAL REPAIR LENGTH SHALL BE 4 FOOT.

CONCRETE REPAIR DETAIL METHOD A 4'
CONCRETE REPAIR DETAILS

SECTION A-A
CONCRETE REPAIR DETAIL METHOD B

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT SHALL BE EIGHT (8') OR LONGER THAN THE PAVEMENT THICKNESS (T). THE CONTRACTOR MAY USE SMOOTH DOWEL BARS OR SMOOTH DOWELS AS PER STD. DET. PVT1. THE CONTRACTOR HAS THE OPTION TO USE TYPE D OR MODIFIED TYPE E JOINTS. SEE STD. DET. PVT1 FOR TYPE D JOINTS. SEE STD. DET. PVT2 FOR MODIFIED TYPE E JOINTS.

REPAIR LENGTH
TYP.

SMOOTH DOWEL BARS

SEE SEALANT DETAILS STANDARD DETAIL PVT1

EXISTING SHOULDER

EXISTING PAVEMENT

EXISTING BASE

T/2 T=PAVEMENT THICKNESS

SECTION A-A

CONCRETE REPAIR DETAIL METHOD C

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT WHERE THE REPAIR EXCEEDS 36" ON BOTH SIDES OF THE JOINT SHALL BE A MINIMUM OF 6' FROM AN EXISTING TRANSVERSE JOINT. DETAIL METHODS A, B, C AND D SHALL APPLY.

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.

REPAIRS PERFORMED TO COMPLETELY REPLACE SLABS BETWEEN TWO JOINTS. EXISTING DOWELS AND EXPANSION ANCHORS OF EXISTING SLABS SHALL NOT BE LESS THAN 6' IN LENGTH.

GROUT RETENTION RING

LOAD TRANSFER UNIT AS PER STD. DET. PVT4

CONCRETE REPAIR DETAIL METHOD D

REPAIRS PERFORMED AT AN EXISTING TRANSVERSE JOINT WHERE THE REPAIR IS PERFORMED AT A TRANSVERSE JOINT. DETAIL METHODS A, B, C AND D SHALL APPLY.

REPAIR LENGTH
TYP.

SMOOTH DOWEL BARS

SEE SEALANT DETAILS STANDARD DETAIL PVT1

EXISTING SHOULDER

EXISTING PAVEMENT

EXISTING BASE

T/2 T=PAVEMENT THICKNESS

SECTION A-A

CONCRETE REPAIR DETAIL METHOD E

REPAIRS PERFORMED IN A TRANSVERSE JOINT SHALL BE EIGHT (8') OR LONGER THAN THE PAVEMENT THICKNESS (T). THE CONTRACTOR MAY USE SMOOTH DOWEL BARS OR SMOOTH DOWELS AS PER STD. DET. PVT1. THE CONTRACTOR HAS THE OPTION TO USE TYPE D OR MODIFIED TYPE E JOINTS. SEE STD. DET. PVT1 FOR TYPE D JOINTS. SEE STD. DET. PVT2 FOR MODIFIED TYPE E JOINTS.

REPAIR LENGTH
TYP.

SMOOTH DOWEL BARS

SEE SEALANT DETAILS STANDARD DETAIL PVT1

EXISTING SHOULDER

EXISTING PAVEMENT

EXISTING BASE

T/2 T=PAVEMENT THICKNESS

SECTION A-A

CONCRETE REPAIR DETAIL METHOD F

REPAIRS PERFORMED TO COMPLETELY REPLACE SLABS BETWEEN TWO JOINTS. EXISTING DOWELS AND EXPANSION ANCHORS SHALL BE COMPLETELY REMOVED WHEN A REPAIR IS PERFORMED AT A TRANSVERSE JOINT. DETAIL METHODS A, B, C AND D SHALL APPLY.
PEDESTRIAN GATE DETAIL

VEHICULAR GATE DETAIL

NOTES

The applicable details and notes of Standard Sheet FI (Sheet 1 of 2) shall apply to this Standard Sheet. Exception. "Normal Length" line posts, all other posts and braces shall be galvanized steel pipe members or steel rolled formed members as shown in the "Fence Members" table herein. When galvanized pipe posts are used, galvanized post braces shall be used.

When roll formed posts are used, roll formed post braces shall be employed.

Roll formed posts and braces shall meet the requirements of 112.9 of the specifications.

Strengtheners and accompanying post bands shall not be used with the roll formed posts. Instead, the fence fabric shall be integrally woven into the lock loops of the posts.

Post caps shall not be used on roll formed posts. Gate frames and gate vertical braces shall be galvanized pipe members. Gate fabric shall have the same coating as the fence fabric. All other metal components of gates shall be galvanized, with the exception of die-cast aluminum corner fittings, or pressed steel corner fittings.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

5' FENCE FABRIC HEIGHT (sheet 2 of 2)

ROLL FORMED MEMBERS

ELEVATION

POST DETAIL

(Fabricated Weight: 5.14 Lbs./Rl.)
Notes
Chain link fence shall be in accordance with Section 608 of the Specifications.
Filter fabric shall be in accordance with Section 715.6.3 of the Specifications.
Super silt fence shall be in accordance with Section 642.6.8 of the Specifications.
Square filter fabric to chain link fabric with ties spaced at 24" centers.
Posts shall be driven.

ELEVATION

SECTION A-A
NOTES

Signs shall be fabricated from 0.08" thick aluminum sheets or #18 gauge galvanized steel sheets. Reflectors are not required. Signs shall have black legends and borders on white backgrounds. The letters and numerals are to be of the size and style shown in the drawing. Channel posts shall meet the requirements of Section 657.2 of the Specifications.

Steel signs and posts shall be galvanized in accordance with ASTM A-153.

Steel hardware shall conform with Subsection 705.23 of the Specifications (aluminum hardware with Subsections 705.36 and 705.37. Steel hardware shall be galvanized in accordance with ASTM A-153.

Top of posts shall extend to the top of signs.

All posts and signs shall be punched with 3/8-inch holes on each vertical centerline, holes shall be so located that the signs can be attached to the posts of three inches below the top of the signs and three inches above the bottom of the signs.
STANDARD SURVEY MARKER

PLAN VIEW

- Ground Line
- Bronze Casting
- Concrete
- Machine finished, stamped after setting to indicate Center Point, Centerline, Stationing & Monument Elevation, or as directed by the Engineer
- Mark for alignment reference after setting
- #6 Rebar
  - 3'-0" Length

ELEVATION VIEW

- Ground Line
- Bronze Casting
- Concrete
- Provide Cap
- #3 Rebar

SECTION E-E

NOTES

Survey markers shall conform to the requirements of the Standard Specifications. Sufficient reinforcement shall be included in precast survey markers to resist handling stresses.

ALTERNATE SURVEY MARKER

PLAN VIEW

- Ground Line
- Bronze Casting
- Concrete
- Deep hex socket that won't "wobble" when tapped on to the rebar
- Mark for alignment reference Center punch & cross
- #6 Rebar

ELEVATION VIEW

- Ground Line
- Bronze Casting
- Concrete
- #6 Rebar
  - 36" Long
- 3 1/4" Min. Aluminum Domed Cap for
  - #6 Rebar with Plastic Insulator
- Plastic insulator that locks cap tight on to rebar and helps prevent dissimilar metal corrosion.

SECTION E-E

NOTES

Survey markers shall conform to the requirements of the Standard Specifications.

MARKERS
NOTES:
ALL WOOD IS TO BE PRESSURE TREATED PINE.
TESTING OF THE WOODEL WILL NOT BE REQUIRED.
THE COST OF ALL WORK AND MATERIALS SHALL INCLUDE
THE MAILBOX SUPPORT, REMOVING EXISTING MAILBOX SUPPORTS,
AND REINSTALLING EXISTING MAILBOXES INTO NEW SUPPORTS.