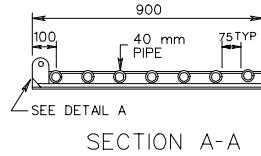


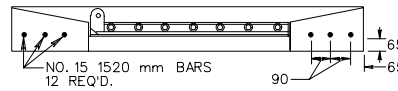
PLAN VIEW



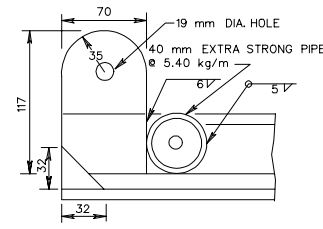
SECTION A-A



SECTION B-B



COVER DETAIL



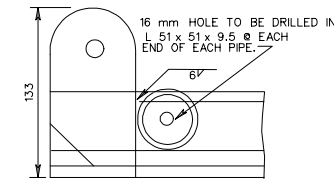
DETAIL A (IN-SIDE)

- NOTES:
1. GRATE AND COLLAR ARE TO BE GALVANIZED AFTER FABRICATION. COST OF THIS GRATE AND COLLAR ARE TO BE INCLUDED IN THE PRICE BID FOR STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
 2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. FOR PRECAST DETAILS SEE SHEET 2 OF 4.
 3. WEEP HOLES SHALL NOT BE PROVIDED.
 4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 1200 mm OR GREATER ABOVE INVERT OF OUTLET PIPE.
 5. FOR STEP DETAILS SEE ST'D. ST-1
 6. FOR DETAILS ON METAL PLATE AND DEBRIS RACK SEE ST'D.
 7. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 100mm HIGH NUMERALS AND 25mm WIDE HORIZONTAL STRIPES AT 300mm INTERVALS FROM INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).

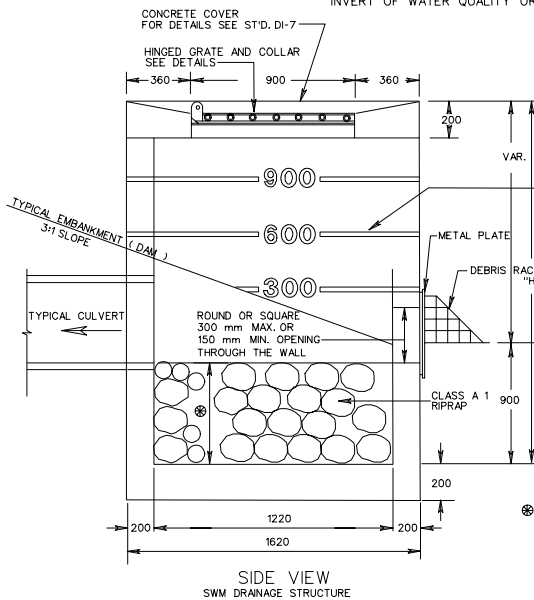
CAST IN PLACE CLASS 20 CONCRETE TO BE USED. MAXIMUM DEPTH (H) TO BE 4.0 m

PIPE SIZE	300	375	450	600	750	900	1050
MINIMUM DEPTH H	1500	1606	1689	1854	2019	2184	2350
CU. METERS CONC.	2.3	2.41	2.49	2.64	2.78	2.91	3.04

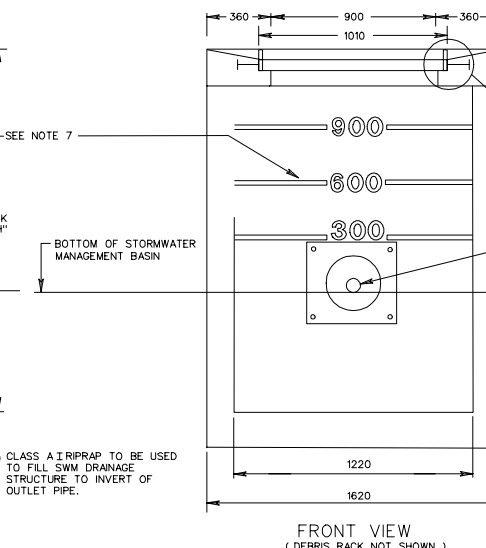
INCREMENT PER METER OF ADDITIONAL DEPTH "H" -1.14 m³



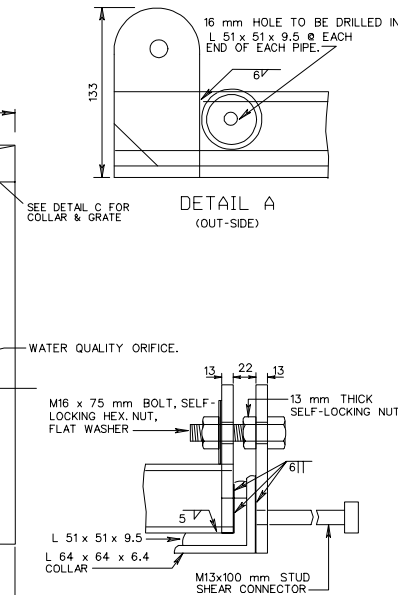
DETAIL A (OUT-SIDE)



SIDE VIEW SWM DRAINAGE STRUCTURE



FRONT VIEW (DEBRIS RACK NOT SHOWN)



DETAIL B REVISED 12/99

SPECIFICATION REFERENCE	
302	

STORMWATER MANAGEMENT DRAINAGE STRUCTURE
CAST-IN-PLACE
VIRGINIA DEPARTMENT OF TRANSPORTATION

25mm WIDE HORIZONTAL STRIPES AT 300mm INTERVALS FROM INVERT OF
WATER QUALITY ORIFICE (ALL VISIBLE SIDES).
+H NUMERALS AND

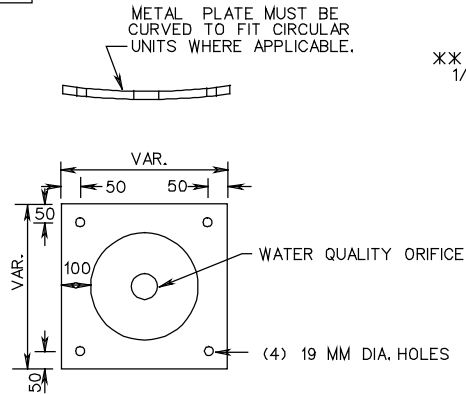
SEE SHEET 1 OF 4
FOR COLLAR
& GRATE DETAILS.

900

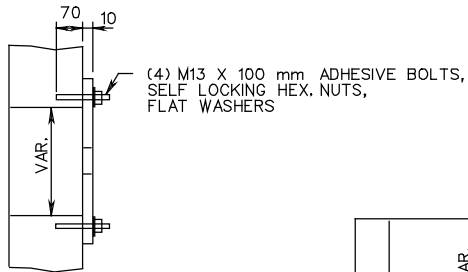
1500 DIA.

REVISED 12/99
SHEET 2 OF 4

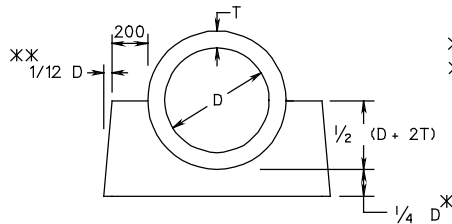
STORMWATER MANAGEMENT DRAINAGE STRUCTURE
PRECAST



RISER METAL PLATE DETAIL
(NOT GALVANIZED)



DETAIL FOR METAL PLATE AND
WATER QUALITY ORIFICE



CONCRETE CRADLE

* BUT NOT LESS THAN 150 mm.

XX IF THE PIPE IS LAID IN AN EXCAVATED TRENCH, THEN THE SIDE WALLS MAY CONFORM TO THE TRENCH SHAPE (IE THE TRENCH MAY BECOME THE CRADLE FORM).

CONCRETE CRADLE IS TO BE INSTALLED UNDER THE ENTIRE LENGTH OF CULVERT AT EACH STORMWATER MANAGEMENT BASIN.

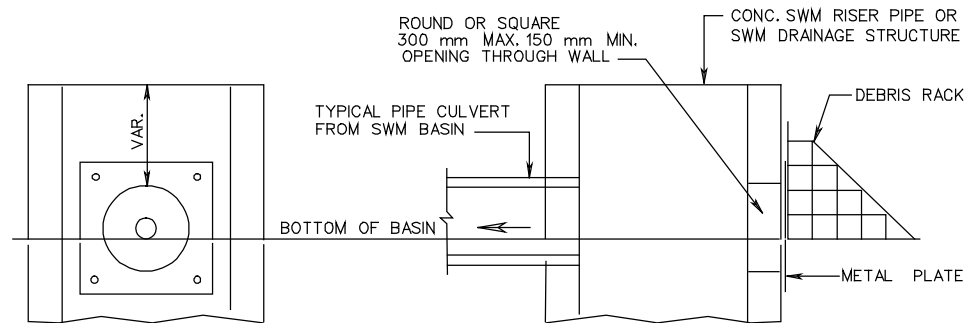
CONCRETE CRADLE IS TO BE PAID FOR AS MISCELLANEOUS CONCRETE AND SUMMARIZED AS EACH PER LOCATION.

NOTES:

TO PROVIDE THE REQUIRED WATER QUALITY ORIFICE, ALL STORMWATER MANAGEMENT (SWM) BASINS SHALL BE CONSTRUCTED WITH THE FOLLOWING:

1. FOR SWM DRAINAGE STRUCTURES, SWM DAMS OR SWM RISER PIPES OF CONCRETE, AN OPENING SHALL BE PROVIDED IN THE CONCRETE WALL: 300 mm MAX. OR 150 mm MIN. AND SHALL BE COVERED WITH THE 10 mm METAL PLATE.
2. DEBRIS RACK SHALL BE ATTACHED TO SWM DRAINAGE STRUCTURE, SWM DAM OR SWM RISER PIPE TO COVER WATER QUALITY ORIFICE.
3. SIZE OF WATER QUALITY ORIFICE IS TO BE SPECIFIED FOR EACH BASIN.

FOR DETAILS OF SWM DRAINAGE STRUCTURE SEE SPECIAL DESIGN DRAWING NO. 2216



DETAIL FOR METAL PLATE AND
WATER QUALITY ORIFICE

SIDE VIEW WITH DEBRIS RACK

TYPICAL SWM DRAINAGE STRUCTURE

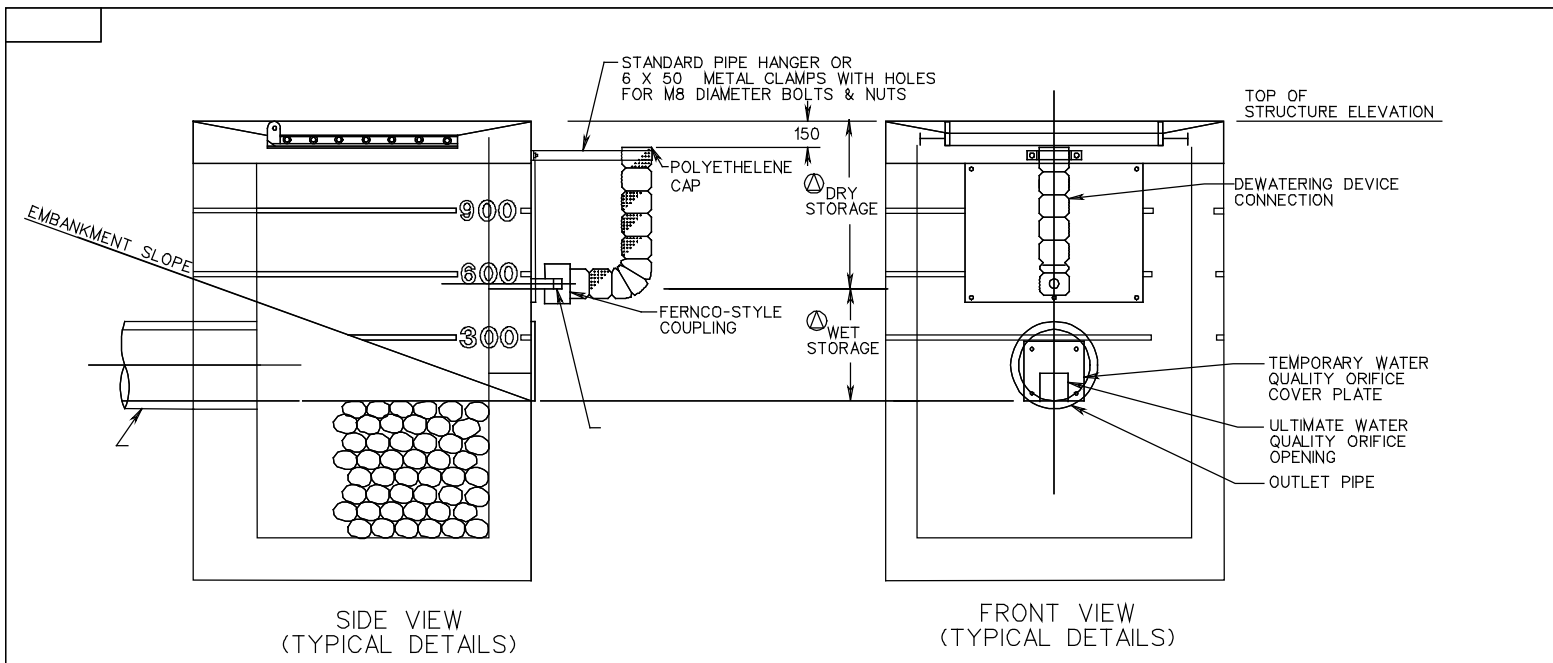
REVISED 12/99

SHEET 4 OF 4

STORMWATER MANAGEMENT (SWM) DETAILS
DEBRIS RACK, METAL PLATE, WATER QUALITY ORIFICE, CONCRETE CRADLE

SPECIFICATION
REFERENCE

302



NOTES: TEMPORARY SEDIMENT BASIN (TSB)

NEW 12/99

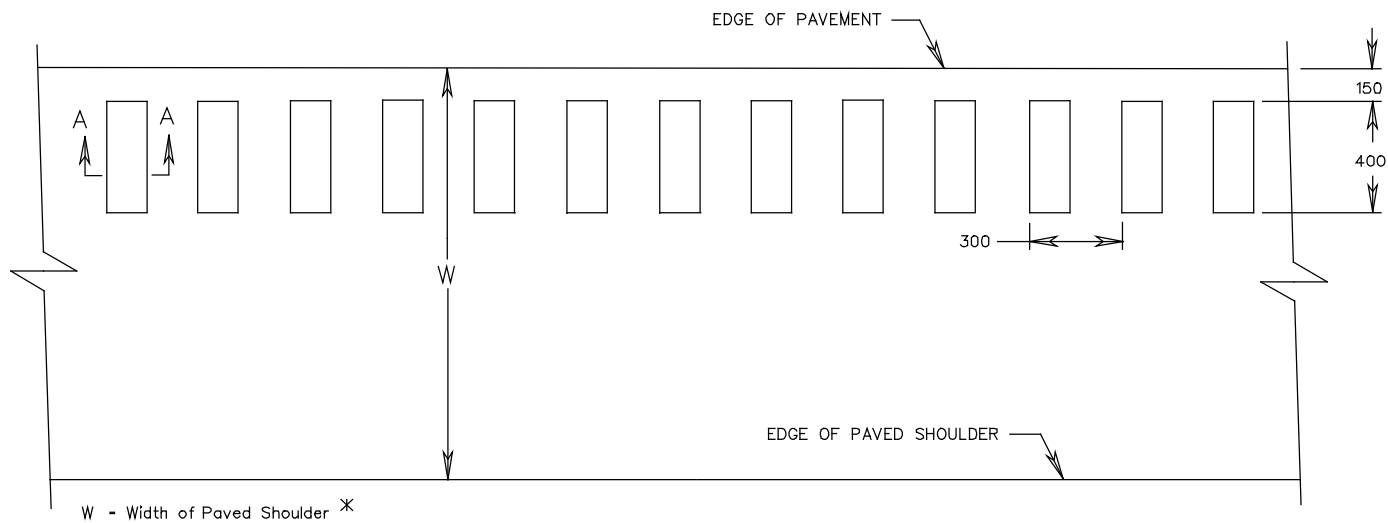
STORMWATER MANAGEMENT BASIN - MODIFICATION OF STRUCTURE FOR USE AS TEMPORARY SEDIMENT BASIN (TSB)

116.05 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

302

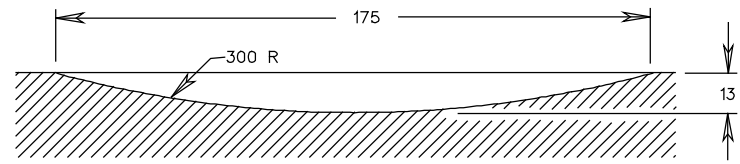


W - Width of Paved Shoulder *

PLAN VIEW

NOTES

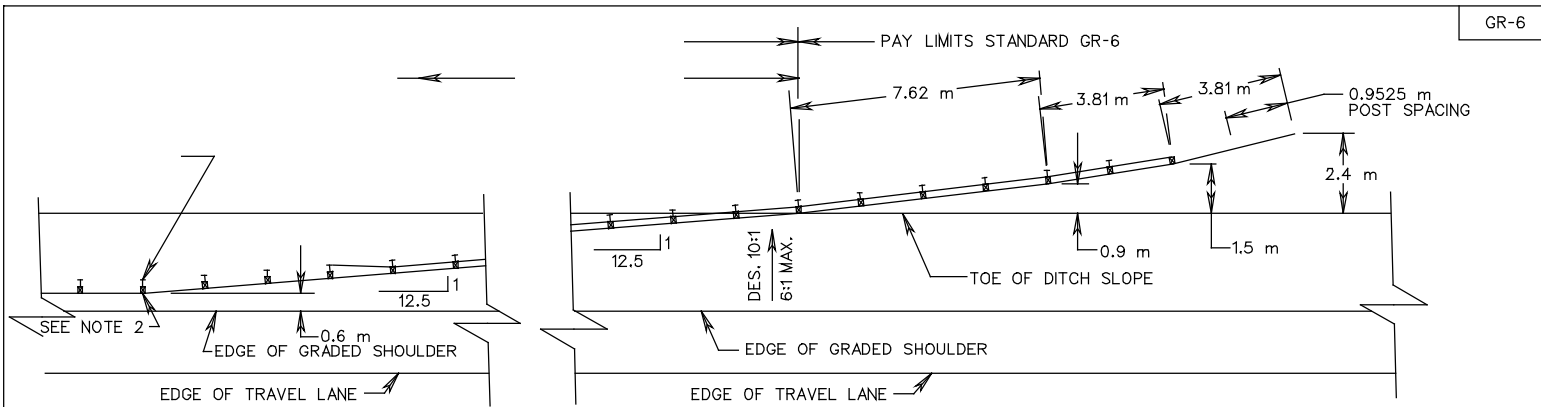
- Rumble Strips shall be placed continuously as directed by the Engineer.
- Rumble Strips shall not be placed within limits of Bridge Drainage Aprons or Special Design Shoulder Slot Inlets.
- Rumble Strips shall be placed on mainline shoulders only.
- * Where bicycles are not prohibited, the minimum width of the outside paved shoulder shall be 2.4 m.



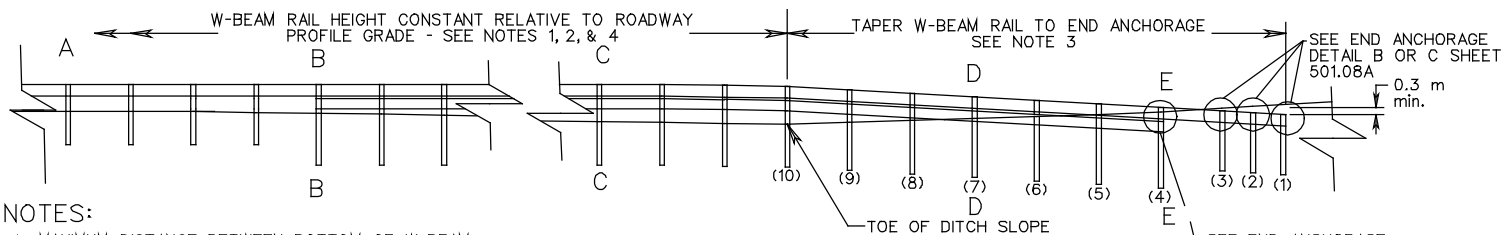
SECTION A-A

REVISED 12/99

SPECIFICATION REFERENCE	RUMBLE STRIPS (ASPHALT SHOULDER)		
315	VIRGINIA DEPARTMENT OF TRANSPORTATION		UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS
			304.01



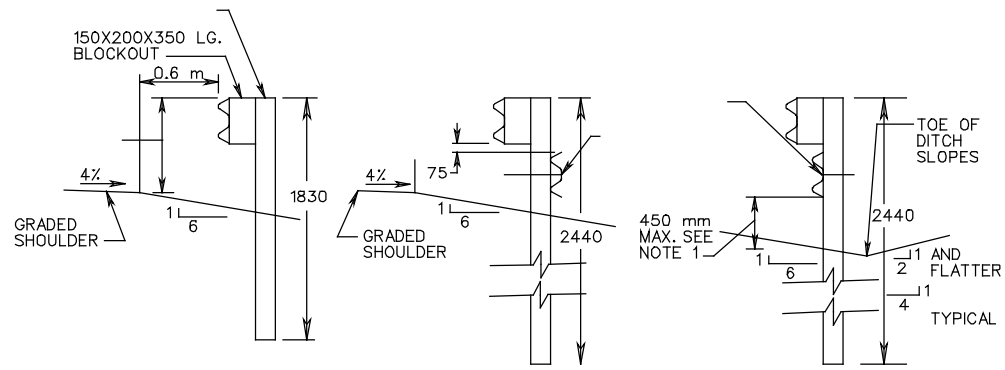
PLAN



ELEVATION

NOTES:

1. MAXIMUM DISTANCE BETWEEN BOTTOM OF W-BEAM RAIL AND FINISH GRADE IS 450 mm. WHEN DOUBLE RAIL IS REQUIRED, TAPER BOTH W-BEAM RAILS TO MAINTAIN 450 mm DISTANCE FROM THE GROUND.
- 2.
3. #
- 4.
5. STANDARD GR-6 TERMINAL TREATMENT MAY BE USED AT THE RUN-ON END OF DIVIDED HIGHWAYS (LEFT AND RIGHT OF TRAFFIC) AND AT THE RUN-ON AND RUN-OFF ENDS ON UNDIVIDED HIGHWAYS.



SECTION A-A

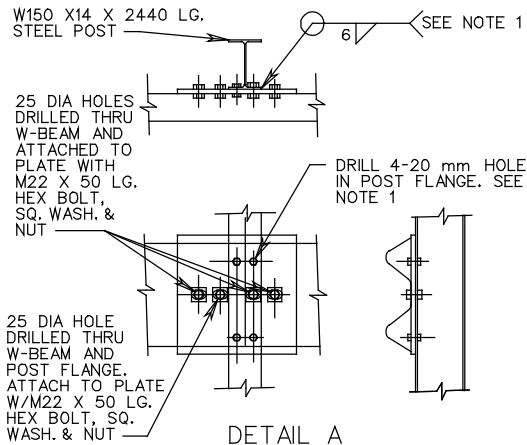
SECTION B-B

SECTION C-C

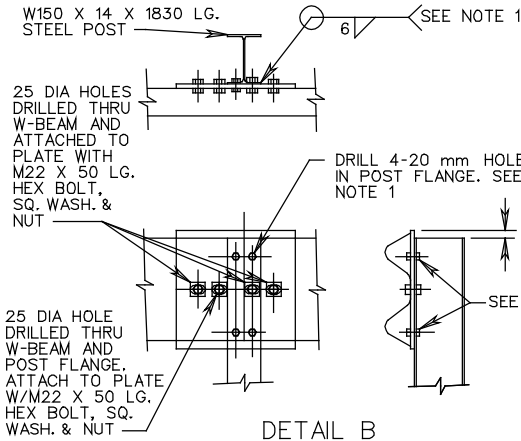
FOR SECTIONS D-D & E-E, AND END ANCHORAGE DETAILS SEE SHEET 501.08A.

SPECIFICATION REFERENCE	TERMINAL TREATMENT FOR W BEAM GUARDRAIL		
505 221	VIRGINIA DEPARTMENT OF TRANSPORTATION		UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS
			501.08

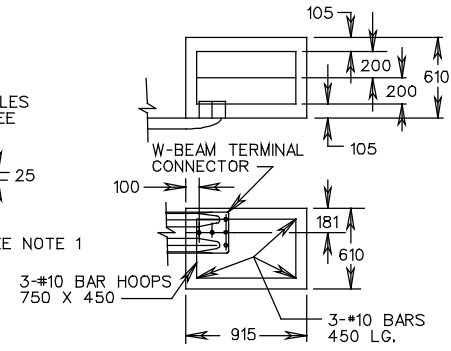
GR-6



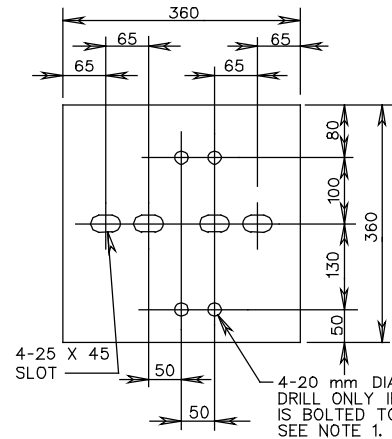
DETAIL A
END ANCHORAGE



DETAIL B
END ANCHORAGE (POST)



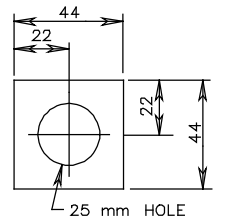
DETAIL C
END ANCHORAGE (CONCRETE)



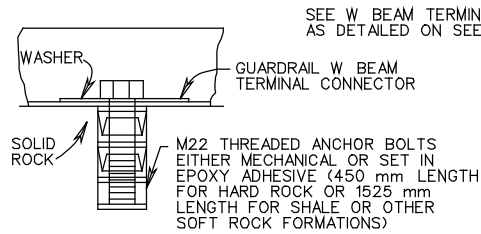
DETAIL D
13 mm THICK STEEL PLATE

NOTE:

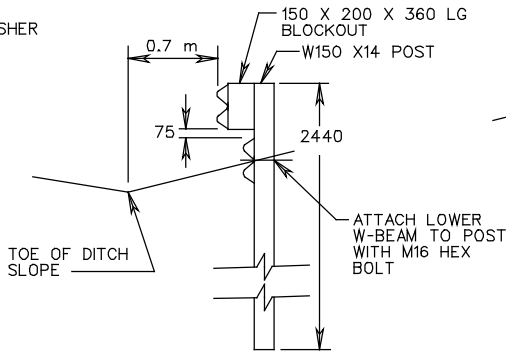
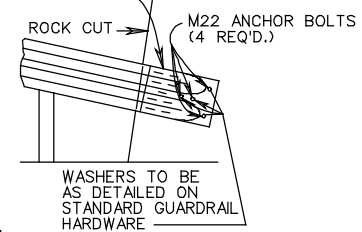
1. 13 mm STEEL PLATE MAY BE WELDED OR BOLTED TO POST. IF PLATE IS BOLTED TO POST USE 4-M16 X 40 L.G. HEX HEAD BOLTS W/ HEX NUTS. IF PLATE IS WELDED TO POST DO NOT DRILL 20 mm HOLES IN PLATE OR IN POST FLANGES.
2. CONCRETE END ANCHORAGE MAY BE USED IN PLACE OF STEEL POST AT 2.4 m OFFSET.



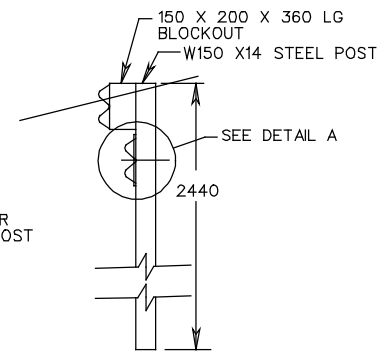
DETAIL E
5 mm THICK SQUARE WASHER



DETAIL F
SOLID ROCK CUT INSTALLATION



SECTION D-D



SECTION E-E

SHEET 2 OF 2

TERMINAL TREATMENT FOR W BEAM GUARDRAIL

REVISED 12/99

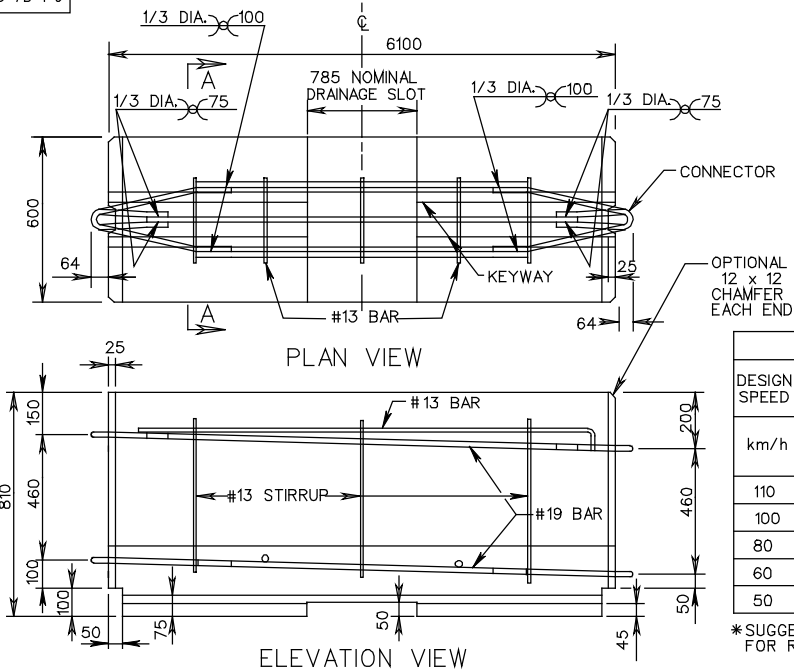
501.08A UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

505
221

MB-7D PC



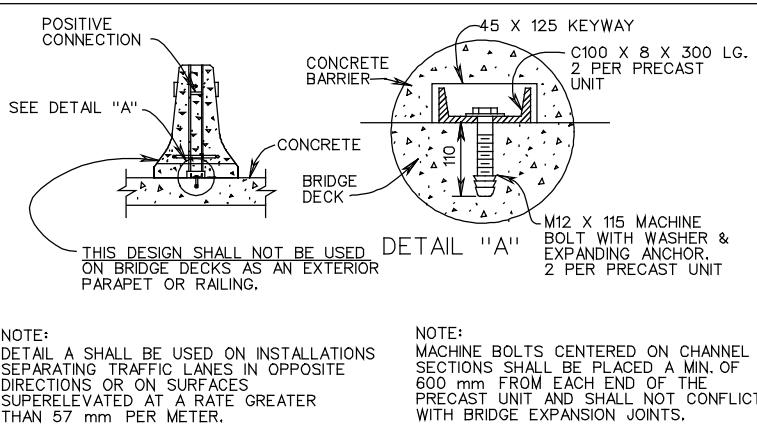
OPTIONAL
12 x 12
CHAMFER
EACH END

FLARE RATES *			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
	SHY LINE m	FLARE RATE	FLARE RATE
110	3.0	30:1	20:1
100	2.5	26:1	17:1
80	2.0	21:1	14:1
60	1.5	17:1	11:1
50	1.0	13:1	8:1

*SUGGESTED MAXIMUM FLARED RATE FOR RIGID BARRIER SYSTEMS.

NOTES:

- FOR OTHER NCHRP 350 APPROVED BARRIERS WITH POSITIVE CONNECTIONS SEE SHEET A-105.
- AT THE OPTION OF THE MANUFACTURER, ADDITIONAL REINFORCING MAY BE ADDED TO THE PRECAST CONCRETE BARRIER FOR HANDLING.
- CONCRETE SHALL BE 30 MPa MINIMUM.
- BARRIER DELINEATOR SIZE, COLOR AND SPACING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- COST OF DELINEATOR SHALL BE INCLUDED IN THE PRICE BID FOR TRAFFIC BARRIER SERVICE.
- OTHER PRECAST TRAFFIC BARRIER SERVICE CONCRETE DESIGNS THAT MEET NCHRP 350 TEST REQUIREMENTS AND HAVE BEEN ACCEPTED BY VDOT AS AN ACCEPTABLE ALTERNATE TO THE STANDARD DESIGN MAY BE SUBSTITUTED.
- A 25 mm RADIUS MAY BE USED AS AN ALTERNATE FOR THE 20 mm CHAMFER.
- BARRIER DELINEATOR REFLECTIVE SURFACE IN ALL INSTANCES SHALL BE FACING ONCOMING TRAFFIC.
- BARRIER VERTICAL PANELS SHALL BE SPACED IN ACCORDANCE WITH VIRGINIA WORK AREA PROTECTION MANUAL.

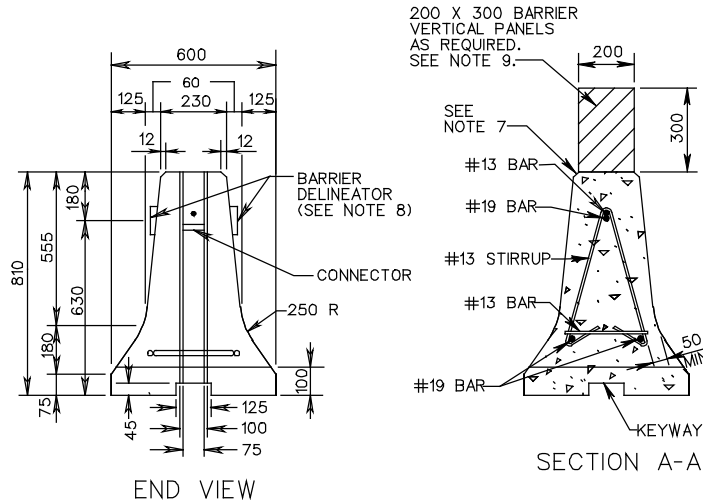


NOTE:
DETAIL A SHALL BE USED ON INSTALLATIONS SEPARATING TRAFFIC LANES IN OPPOSITE DIRECTIONS OR ON SURFACES SUPERELEVATED AT A RATE GREATER THAN 57 mm PER METER.

NOTE:
MACHINE BOLTS CENTERED ON CHANNEL SECTIONS SHALL BE PLACED A MIN. OF 600 mm FROM EACH END OF THE PRECAST UNIT AND SHALL NOT CONFLICT WITH BRIDGE EXPANSION JOINTS.

DETAIL FOR TEMPORARY
INSTALLATION ON BRIDGE DECK

SHEET 1 OF 2
REVISED 12/99



200 X 300 BARRIER
VERTICAL PANELS
AS REQUIRED.
SEE NOTE 9.

SEE NOTE 7

SECTION A-A

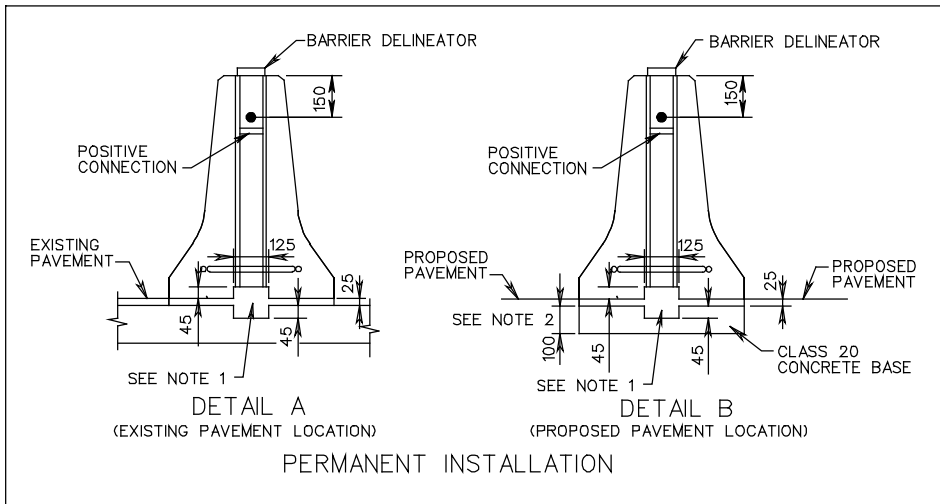
PRECAST TRAFFIC BARRIER SERVICE CONCRETE

VIRGINIA DEPARTMENT OF TRANSPORTATION

501.45 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

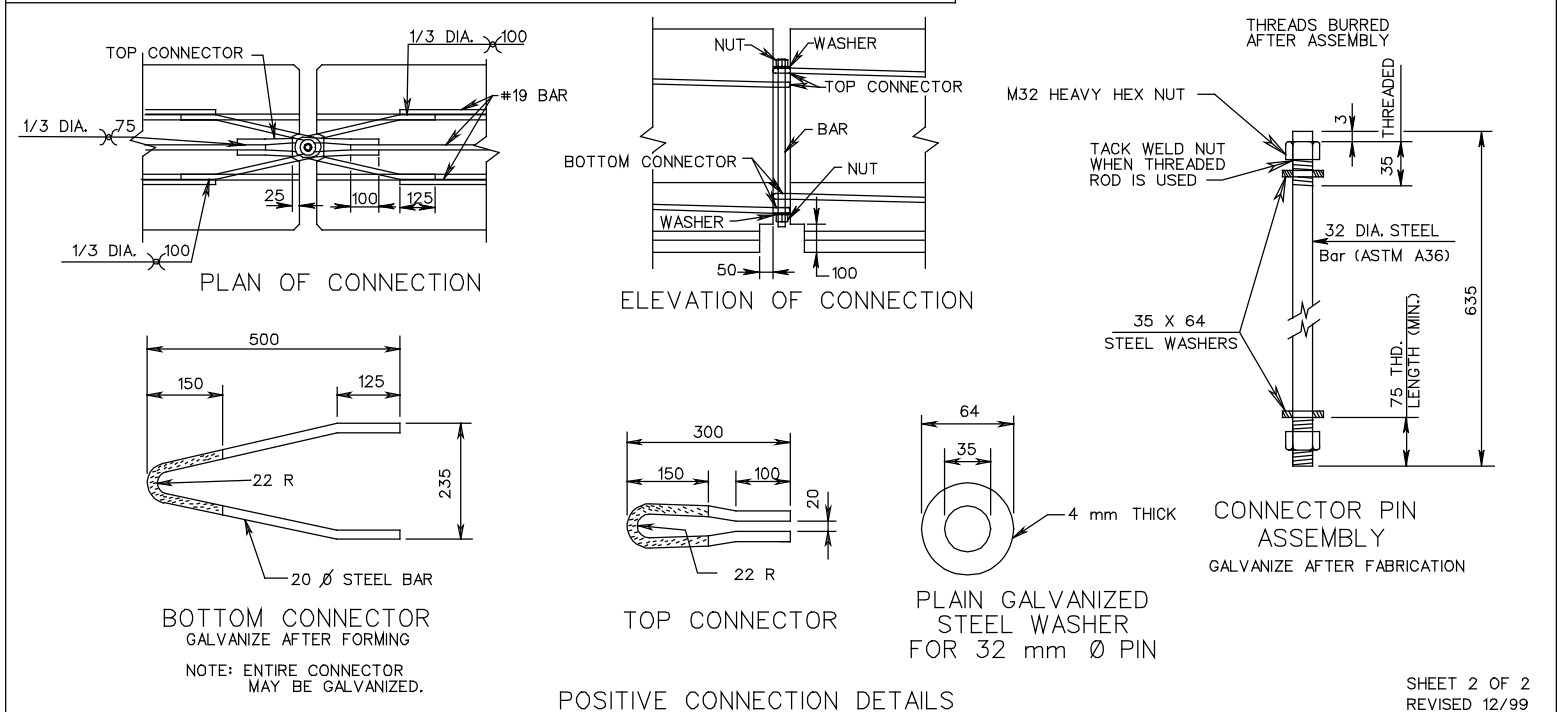
SPECIFICATION
REFERENCE

105
512



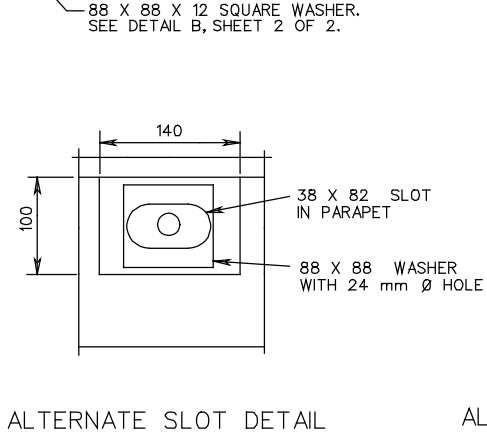
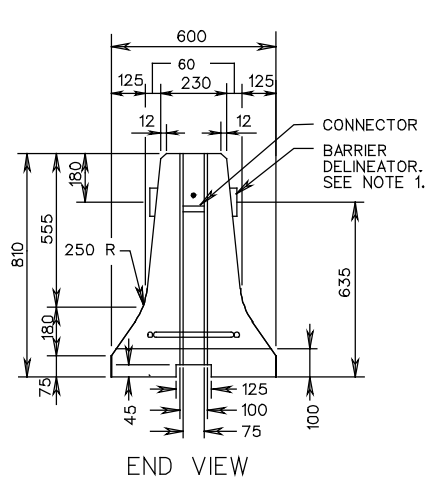
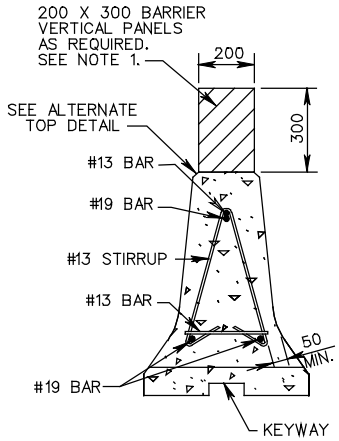
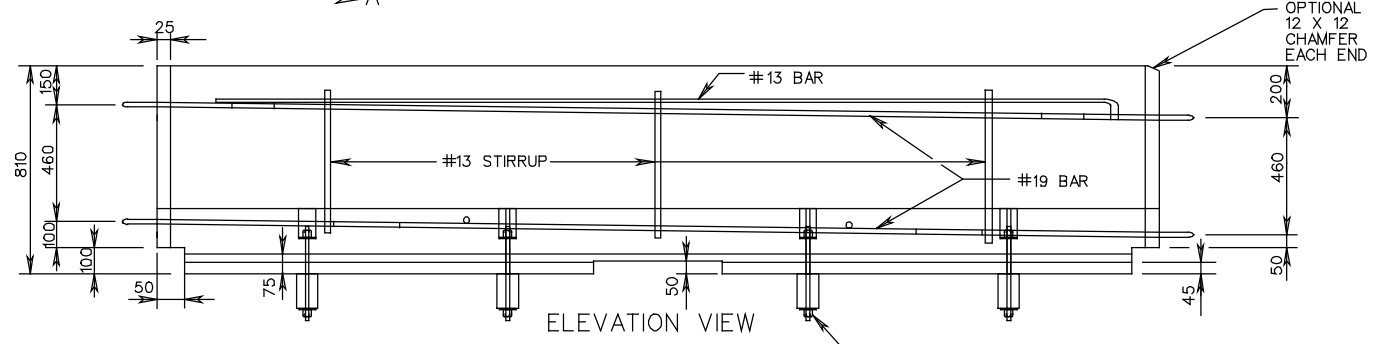
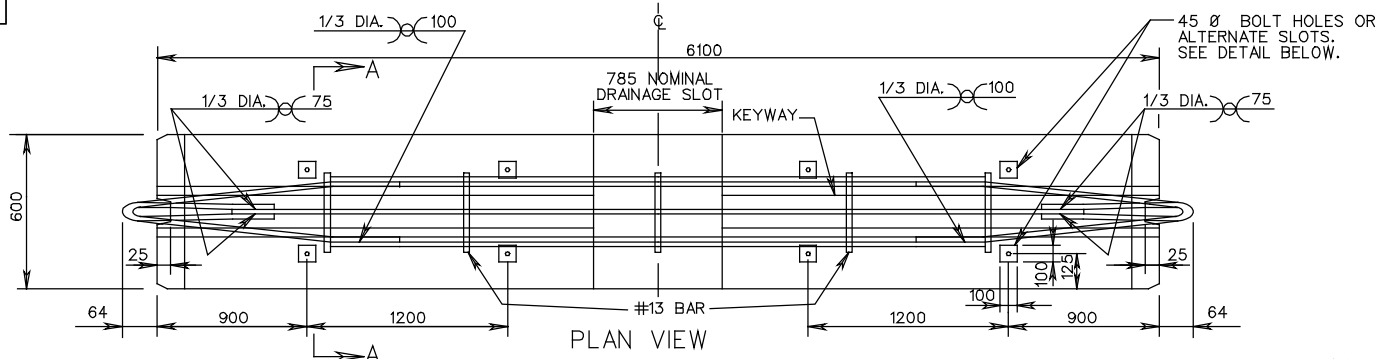
NOTES:

1. HIGH STRENGTH GROUT OR MORTAR SHALL BE IN ACCORDANCE WITH SECTION 218 OF THE SPECIFICATIONS.
2. 100 mm OR VARIABLE TO COINCIDE WITH SUBGRADE COURSE.
3. WHEN USED AS MEDIAN BARRIER IN A PERMANENT LOCATION, DRAINAGE SLOTS WILL BE COMPLETELY FILLED AND SEALED WITH MORTAR OR GROUT UNLESS UNIT WILL BE LOCATED OVER MEDIAN DRAINAGE STRUCTURE.
4. BARRIER DELINEATOR SIZE, COLOR, AND SPACING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
5. COST OF DELINEATOR TO BE INCLUDED IN THE PRICE BID FOR MEDIAN BARRIER.
6. REFLECTIVE SURFACE OF BARRIER DELINEATOR IN ALL INSTANCES SHALL BE FACING ONCOMING TRAFFIC.
7. PIN AND CONNECTORS SHALL BE ASTM-A36, REINFORCING STEEL BARS SHALL BE ASTM A 615 GRADE 400. ONE CONNECTOR PIN ASSEMBLY WITH EACH BARRIER SECTION.
8. FOR OTHER NCHRP 350 APPROVED BARRIERS WITH POSITIVE CONNECTIONS SEE SHEET A-105.



<p>SPECIFICATION REFERENCE</p> <p>105 512</p>	<p>PRECAST TRAFFIC BARRIER SERVICE CONCRETE</p> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p>UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS</p>	<p>501.46</p>
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MB-11A



SHEET 1 OF 2
REVISED 12/99

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE)
(FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

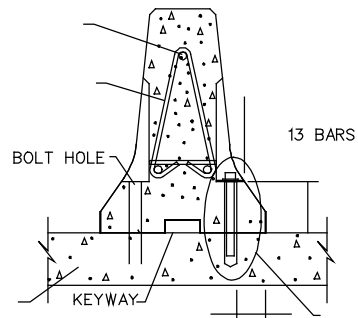
501.62 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

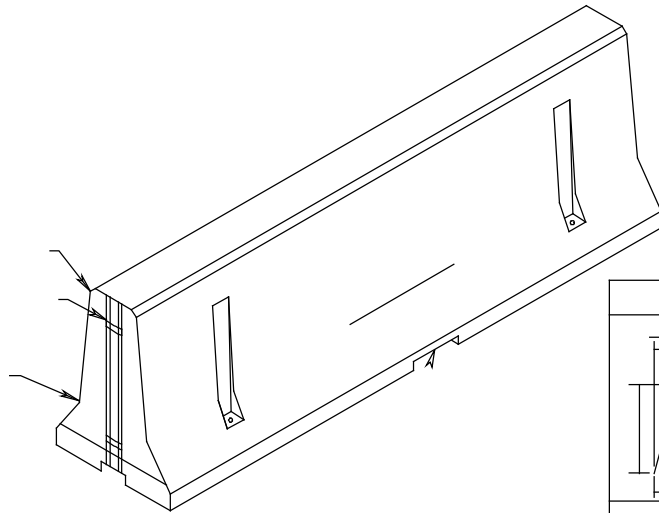
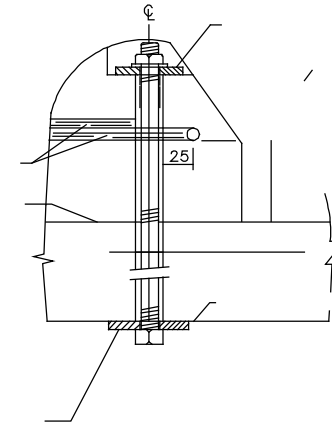
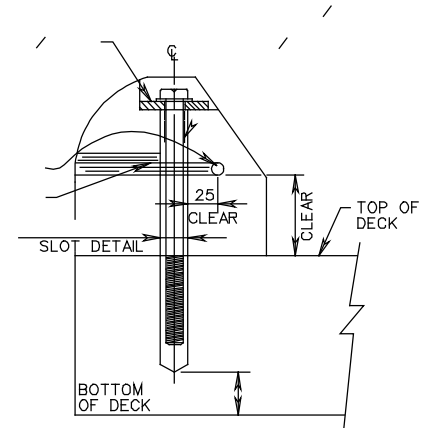
SPECIFICATION REFERENCE

105
512

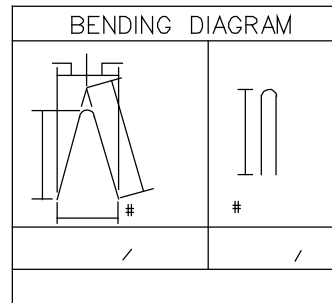
NOTES:



SECTION B-B
(ANCHOR BOLT)
BOLT DOWN SIDE ADJACENT TO TRAFFIC



SECTION

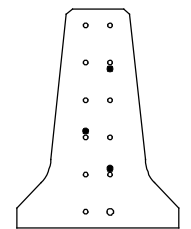
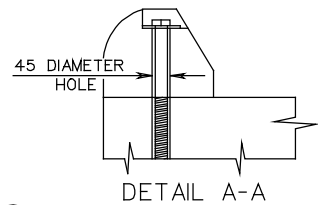
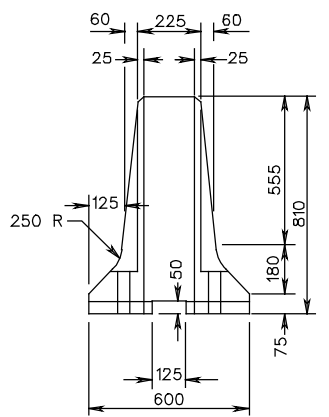
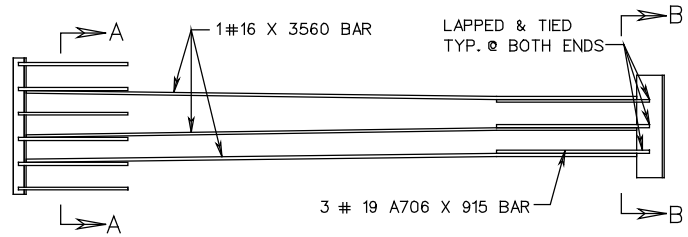
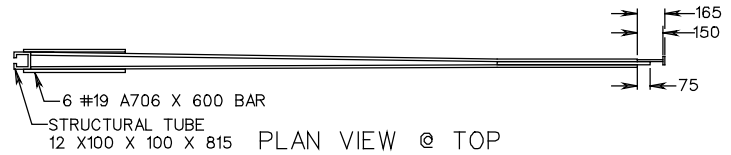
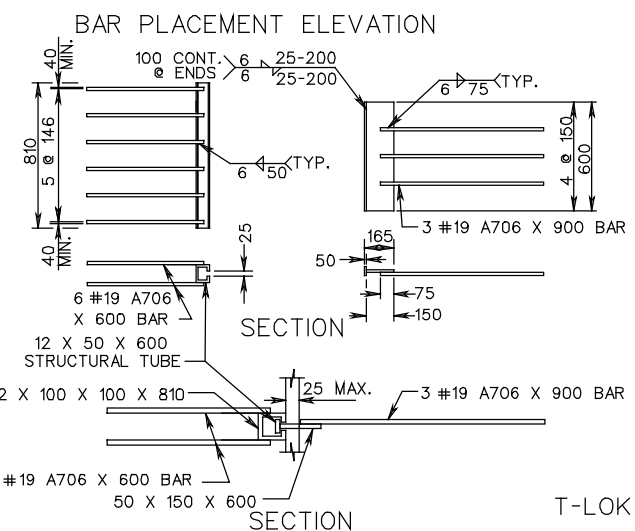
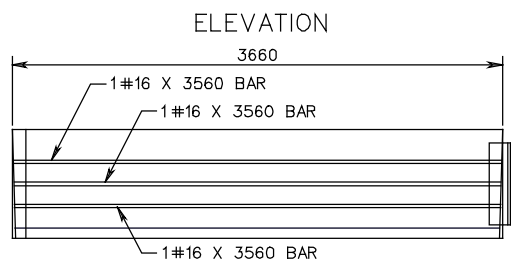
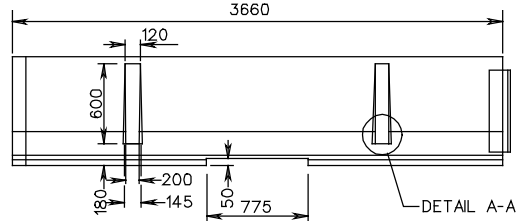
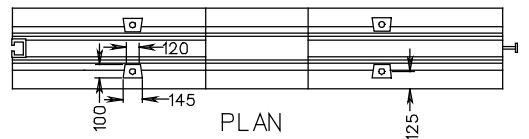


SPECIFICATION
REFERENCE

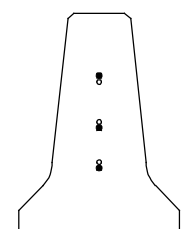
105
512

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE)
(FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

VIRGINIA DEPARTMENT OF TRANSPORTATION



SECTION A-A



SECTION B-B

LEGEND	
●	= 3560 BAR
○	= 600 AND 900 BAR

- NOTES:
- (1) MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT THE AGE OF 28 DAYS (FC) SHALL BE 30 MPa.
 - (2) ALL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 400.
 - (3) STANDARD BARRIER SECTIONS SHALL BE 3660 AS SHOWN OR 5490 mm SHORTER SECTIONS SHALL BE CAST IN REQUIRED LENGTHS AS ONE UNIT. LONGER SECTIONS SHALL BE CAST TO REQUIRED DIMENSIONS IN TWO UNITS.
 - (4) ALL EXPOSED METAL IS TO BE GALVANIZED FOR PERMANENT LOCATIONS.
 - (5) ALL EXPOSED METAL MAY BE GALVANIZED FOR TEMPORARY LOCATIONS.
 - (6) T-LOK AS MANUFACTURED BY ROCKINGHAM PRECAST AND TEST FOR NCHRP 350.
 - (7) BEGINNING WITH JANUARY 2000 ADVERTISEMENT ALL POSITIVE CONNECTIONS MUST BE APPROVED BY THE FHWA IN ACCORDANCE WITH NCHRP 350 TEST REQUIREMENTS.

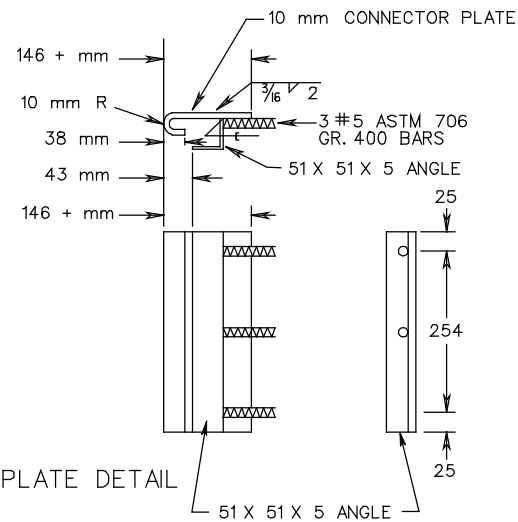
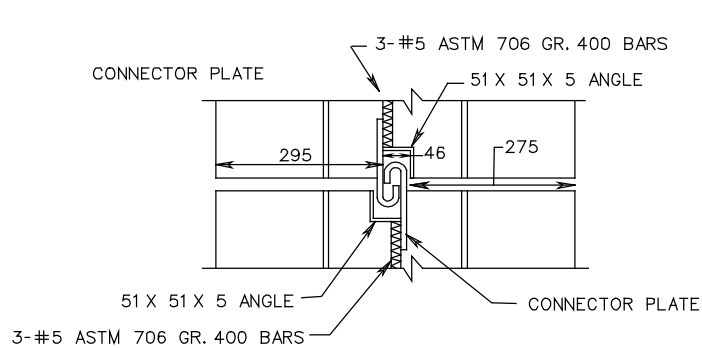
T-LOKTM DETAILS

SPECIFICATION REFERENCE

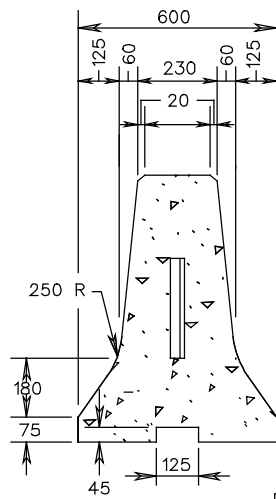
PRECAST CONCRETE MEDIAN BARRIER POSITIVE CONNECTION OPTIONS

REVISED 12/99

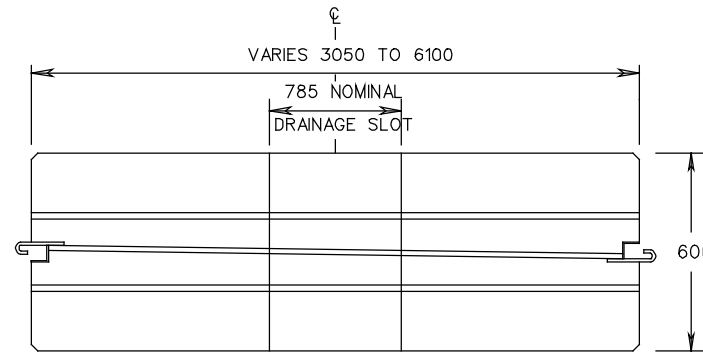
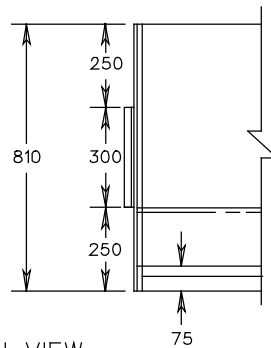
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS



CONNECTOR PLATE DETAIL



ELEVATION VIEW



PLAN VIEW

BEGINNING WITH THE JANUARY 2000 ADVERTISEMENT ALL POSITIVE CONNECTIONS MUST BE APPROVED BY THE FHWA IN ACCORDANCE WITH NCHRP 350 TEST REQUIREMENTS.

NOTES:
ALL EXPOSED METAL TO BE GALVANIZED.
J-J HOOK AS MANUFACTURED BY SMITH MIDLAND AND TESTED FOR NCHRP 350.

J-J HOOK DETAILS

SPECIFICATION REFERENCE	<p>PRECAST CONCRETE MEDIAN BARRIER POSITIVE CONNECTION OPTIONS</p> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p>REVISED 12/99</p> <p>UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS</p>	<p>501.69</p>
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