SECTION I - BARRIER

SHEET NO. NAME

B-L (2010) – BARRIER LEGEND
B-1 – GUARDRAIL APPLICATIONS (TYPES 1-31, 2-31, AND 3-31)
(2010) - 1 PLAN VIEWS
(2010) - 2 ELEVATION VIEWS AND SPLICE DETAIL
(2010) - 3 SECTION VIEWS
B-2 – GRADING FOR GUARDRAIL END TREATMENTS (TYPES 1, 2, AND 3)
(2010) - 1 GUARDRAIL END TREATMENT, TYPE 1
(2010) - 2 GUARDRAIL END TREATMENT, TYPE 2
(2010) - 3 GUARDRAIL END TREATMENT, TYPE 3
B-3 – GUARDRAIL OVER CULVERTS (TYPES 1-31, 2-31, AND 3-31)
(2010) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-31
(2010) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-31
(2010) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-31
B-4 (2010) – END ANCHORAGE, TYPE 31
B-5 – GUARDRAIL TO BARRIER CONNECTION (TYPES 1-31, 2-31, AND EXIT TYPE 31)
(2010) - 1 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31
(2010) - 2 GUARDRAIL TO BARRIER CONNECTION, TYPE 1 HARDWARE
(2010) - 3 GUARDRAIL TO BARRIER CONNECTION, BENT PLATE RUB RAIL
(2010) - 4 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-31
(2010) - 5 GUARDRAIL TO BARRIER CONNECTION, TYPE 2 HARDWARE
(2010) - 6 GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 31
B-6 – BRIDGE RAIL RETROFIT, TYPES 1, 2, 3, AND 4
(2010) - 1 BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS
(2010) - 2 BRIDGE RAIL RETROFIT, TYPES 1 AND 2
(2010) - 3 BRIDGE RAIL RETROFIT, TYPE 2 HARDWARE
(2010) - 4 BRIDGE RAIL RETROFIT, TYPE 3
(2010) - 5 BRIDGE RAIL RETROFIT, TYPE 4
B-7 (2010) – W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION
B-8 – RESERVED
B-9 – RESERVED
B-10 – RESERVED
B-11 – RESERVED
B-12 – RESERVED
B-13 – HARDWARE
(2010) - 1 W-BEAM ELEVATION AND SECTION VIEWS
(2010) - 2 W-BEAM STEEL POST AND OFFSET BLOCK
(2010) - 3 W-BEAM TERMINAL CONNECTOR
(2010) - 4 THRIE BEAM AND THRIE BEAM EXPANSION ELEMENT ELEVATION AND SECTION VIEWS
(2010) - 5 THRIE BEAM STEEL POST AND OFFSET BLOCK
(2010) - 6 ASYMMETRIC AND SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION
(2010) - 7 SHORT AND LONG WOOD BREAKAWAY POSTS, STEEL TUBE, SOIL PLATE, AND OFFSET BLOCKS
(2010) - 8 SWAGED CABLE ASSEMBLAGE AND HARDWARE
(2010) - 9 GUARDRAIL DELINEATOR AND W-BEAM BEARING PLATE
(2010) - 10 GUARDRAIL MOUNTED RAIL
B-14 – CONCRETE SAFETY BARRIER (F SHAPE)
(2009) - 1 32" (960) CONCRETE BARRIER, TYPICAL CAST-IN-PLACE OR SLIP-FORM ELEVATION AND SECTION VIEWS
(2009) - 2 32" (960) CONCRETE BARRIER, TYPICAL PRE-CAST ELEVATION AND SECTION VIEWS
(2009) - 3 42" (1050) CONCRETE BARRIER, TYPICAL CAST-IN-PLACE OR SLIP-FORM ELEVATION AND SECTION VIEWS
(2009) - 4 SLOTTED PLATE CONNECTION DETAILS
B-15 – GUARDRAIL APPLICATIONS (TYPES 1-27, 2-27, AND 3-27)
(2010) - 1 PLAN VIEWS
(2010) - 2 ELEVATION VIEWS AND SPLICE DETAIL
(2010) - 3 SECTION VIEWS

SECTION I - BARRIER (CONT'D)

SHEET NO. NAME

B-16 – GUARDRAIL OVER CULVERTS (TYPES 1-27, 2-27, AND 3-27)
(2010) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-27
(2010) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-27
(2010) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-27
B-17 (2010) – GUARDRAIL END TREATMENT, TYPE 4-27
B-18 (2010) – CURVED GUARDRAIL SECTION
B-19 (2010) – END ANCHORAGE, TYPE 27
B-20 – BURIED END SECTION
(2010) - 1 BURIED END SECTION - SINGLE RAIL
(2010) - 2 BURIED END SECTION - DOUBLE RAIL
(2010) - 3 POST, CONCRETE BLOCK, AND RUBRAIL DETAILS
B-21 – GUARDRAIL TO BARRIER CONNECTION (TYPES 1-27, 2-27, AND EXIT TYPE 27)
(2010) - 1 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27
(2010) - 2 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-27
(2010) - 3 GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 27

SECTION II - CURB & GUTTER

SHEET NO. NAME

C-1 (2009) – P.C.C. CURB, P.C.C. CURB & GUTTER, AND HOT-MIX CURB
C-2 – CURB RAMPS
(2008) - 1 TYPE 1
(2008) - 2 TYPE 2, 3, AND 4
(2008) - 3 SECTIONS FOR TYPES 2, 3, AND 4
(2006) - 4 TYPE 5
C-3 (2010) – ENTRANCES
C-4 (2010) – CURB OPENING DETAILS

SECTION III - DRAINAGE

SHEET NO. NAME

D-1 – 6:1 SAFETY END STRUCTURE
(2001) - 1 DETAIL VIEWS
(2001) - 2 SCHEDULES
D-2 – 10:1 SAFETY END STRUCTURE
(2001) - 1 DETAIL VIEWS
(2001) - 2 SCHEDULES
D-3 – SAFETY GRATES
(2005) - 1 SAFETY END STRUCTURE GRATE AND ASSEMBLY DETAIL
(2007) - 2 PERSONNEL SAFETY GRATE FOR PIPE INLET DETAIL
D-4 (2009) – INLET BOX DETAILS
D-5 – DRAINAGE INLET DETAILS
(2010) - 1 DRAINAGE INLET ASSEMBLY
(2010) - 2 DRAINAGE INLET FRAME AND GRATES
(2010) - 3 DRAINAGE INLET TOP UNITS
(2010) - 4 DRAINAGE INLET COVER SLAB DETAILS
(2010) - 5 DOUBLE INLET COVER SLAB DETAILS
(2010) - 6 34" (865) x 24" (610) DRAINAGE INLET AND COVER SLAB DETAILS
(2010) - 7 34" (865) x 18" (455) DRAINAGE INLET DETAILS
(2010) - 8 DRAINAGE INLET TOP UNIT, TYPE S
(2010) - 9 DOGHOUSE INLET BOX

SECTION III - DRAINAGE (CONT'D)

SHEET NO.	NAME
D-6	– MANHOLE DETAILS
	(2009) - 1 BOX MANHOLE ASSEMBLY
	(2001) - 2 ROUND MANHOLE ASSEMBLY
	(2001) - 3 MANHOLE, TOP UNIT, FRAME AND COVER
	(2007) - 4 BOX MANHOLE COVER SLAB
D-7	– JUNCTION BOX DETAILS
	(2009) - 1 JUNCTION BOX ASSEMBLY
	(2007) - 2 JUNCTION BOX COVER SLAB
D-8 (2010)	– PIPE BEDDING
D-9 (2008)	– PERFORATED PIPE UNDERDRAIN
D-10 (2007)	– PIPE PLUGGING DETAIL

SECTION IV - EROSION

SHEET NO.	NAME
E-1 (2001)	– INCREMENTAL STABILIZATION
E-2 (2006)	– SILT FENCE
E-3 (2005)	– DRAINAGE INLET SEDIMENT CONTROL
~~E-4 (2001)~~	~~– CURB INLET SEDIMENT CONTROL~~ ** DETAIL REMOVED - SEE SPECIFICATIONS **
E-5 (2006)	– STONE CHECK DAM
E-6 (2005)	– SEDIMENT TRAP
E-7 (2005)	– SEDIMENT TRAP, USING DRAINAGE INLET AS OUTLET
E-8	– RISER PIPE ASSEMBLY FOR SEDIMENT TRAP
	(2006) - 1 ELEVATION
	(2006) - 2 TRASH HOOD DETAILS
E-9 (2005)	– EROSION CONTROL BLANKET APPLICATIONS
E-10 (2005)	– RIPRAP DITCH
E-11 (2005)	– TEMPORARY SWALE
E-12 (2005)	– PERIMETER DIKE/SWALE
E-13 (2005)	– EARTH DIKE
E-14 (2005)	– TEMPORARY SLOPE DRAIN
E-15 (2005)	– STILLING WELL
E-16 (2005)	– SUMP PIT, TYPES 1 AND 2
E-17 (2005)	– DEWATERING BASIN
E-18 (2005)	– GEOTEXTILE-LINED CHANNEL DIVERSION
E-19 (2005)	– SANDBAG DIVERSION
E-20 (2005)	– SANDBAG DIKE
E-21 (2005)	– STABILIZED CONSTRUCTION ENTRANCE
E-22 (2006)	– SKIMMER DEWATERING DEVICE
E-23	– TURBIDITY CURTAIN
	(2005) - 1 FLOATING TURBIDITY CURTAIN
	(2005) - 2 STAKED TURBIDITY CURTAIN
E-24 (2005)	– PORTABLE SEDIMENT TANK
E-25 (2005)	– TURF REINFORCEMENT MAT APPLICATIONS
E-26 (2006)	– RIPRAP ENERGY DISSIPATOR DETAIL

SECTION V - LANDSCAPING

SHEET NO.	NAME
L-1	– PLANTING DETAILS
(2006) - 1	ROADSIDE SHRUB PLANTING DETAIL
(2006) - 2	TREE PLANTING DETAIL
(2006) - 3	PERENNIAL/GROUND COVER PLANTING DETAIL

SECTION VI - MISCELLANEOUS

SHEET NO.	NAME
M-1 (2001)	– RIGHT-OF-WAY FENCE
M-2 (2008)	– CONCRETE MONUMENT
M-3 (2009)	– BOLLARD AND SHARED-USE PATH DETAILS
M-4 (2007)	– BIKE RACK
M-5 (2004)	– WOOD RAIL FENCE
M-6 (2004)	– PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER
M-7 (2006)	– CHAIN LINK FENCE DETAILS
M-8 (2007)	– P.C.C. PARKING BUMPER

SECTION VII - PAVEMENT

SHEET NO.	NAME
P-1	– P.C.C. PAVEMENT
(2001) - 1	SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)
(2004) - 2	JOINT AND SEALANT DETAILS
(2001) - 3	W BOLT, HOOK BOLT, DOWEL AND TIE BAR DETAILS
(2001) - 4	DOWEL SUPPORT BASKET
(2001) - 5	DOWEL AND TIE BAR PLACEMENT TOLERANCES
P-2	– P.C.C. PAVEMENT PATCHING
(2008) - 1	FULL DEPTH PATCH, PLAN VIEW
(2008) - 2	FULL DEPTH PATCH, SECTION VIEWS
(2004) - 3	FULL DEPTH PATCH, SEALANT DETAILS, GROUT RETENTION DISK, AND DOWEL BAR
(2001) - 4	FULL DEPTH PATCH, DOWEL AND TIE BAR PLACEMENT TOLERANCES
(2001) - 5	PARTIAL DEPTH PATCH, PLAN AND SECTION VIEWS
P-3	– BUTT JOINT DETAILS

SECTION VIII - TRAFFIC

SHEET NO. NAME

T-1 (2005) – CONDUIT JUNCTION WELL, TYPES 1, 2, AND 3
T-2 (2005) – CONDUIT JUNCTION WELL, TYPE 4
T-3 (2005) – CONDUIT JUNCTION WELL, TYPE 5
T-4 (2005) – CABINET BASES, TYPES M AND P
T-5 – POLE BASES
(2005) - 1 ROUND BASE, SQUARE BASE
(2005) - 2 TYPICAL SECTION AND INSTALLATION (BASES 1, 2, 2A, 2B, 3, 3A, 3B, 4 AND 7)
(2008) - 3 TYPICAL SECTION (BASES 5 AND 6) AND POLE BASE DATA CHART
T-6 (2006) – SPECIAL POLE BASE
T-7 (2005) – SIGN FOUNDATION
T-8 (2005) – LOOP DETECTOR TO CONDUIT JUNCTION WELL CONNECTION
T-9 (2005) – TYPE #1 LOOP DETECTOR
T-10 (2005) – TYPE #2 LOOP DETECTOR
T-11 – MESSENGER WIRE ATTACHMENT
(2005) - 1 INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES
(2005) - 2 ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT
T-12 – MESSENGER WIRE ATTACHMENT
(2005) - 1 SPAN WIRE ATTACHMENT BETWEEN POLES
(2005) - 2 DEAD END MESSENGER WIRE ATTACHMENT
T-13 – CONDUIT JUNCTION WELLS
(2005) - 1 TYPE 6
(2006) - 2 TYPE 7
(2006) - 3 TYPES 8 AND 10
T-14 – EMERGENCY PREEMPTION RECEIVER
(2006) - 1 UPRIGHT MOUNT
(2005) - 2 INVERTED MOUNT
T-15 (2009) – BREAKAWAY SIGN POST AND PIN ASSEMBLY DETAILS
T-16 (2010) – WOOD BARRICADE DETAILS

SCALE : N.T.S.

BARRIER LEGEND

ITEM NO.	DESCRIPTION
1	W-BEAM
2	W6 X 9 (W150 x 13.5) STEEL POST
3A 3B	3A - 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK 3B - 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK
4	SPLICE - REQUIRES EIGHT(8) 5/8" (16) GUARDRAIL BOLTS (L=1 1/4" (35)) WITH RECESS NUTS
5	W-BEAM TERMINAL CONNECTOR
6	5/8" (16) GUARDRAIL BOLT (L=1 1/4" (35)) AND RECESS NUT
7A 7B	7A - 5/8" (16) GUARDRAIL BOLT (L=14" (455)) AND RECESS NUT 7B - 5/8" (16) GUARDRAIL BOLT (L=10" (255)) AND RECESS NUT
8	5/8" (16) GUARDRAIL BOLT (L=10" (255)), STEEL WASHER, AND RECESS NUT
9	7/8" (22) HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIES) AND HEX NUT
10	5/8" (16) CARRIAGE BOLT (L=VARIES), STEEL WASHER, AND HEX NUT
11	BEARING PLATE

DELAWARE
DEPARTMENT OF TRANSPORTATION

BARRIER LEGEND

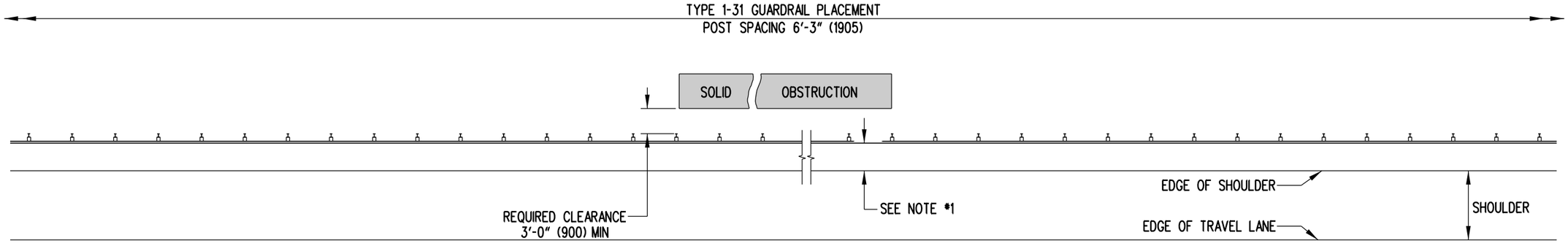
STANDARD NO. B-L (2010) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

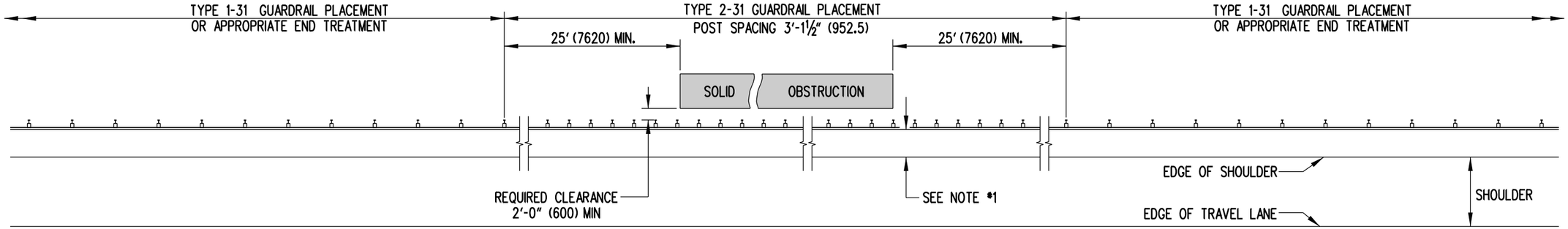
12/6/2010

SCALE : N.T.S.



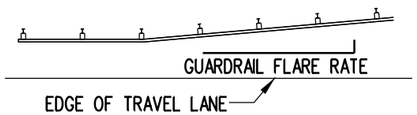
TYPE 1-31 GUARDRAIL

TYPICAL GUARDRAIL TREATMENT
WHEN THE REQUIRED 3'-0" (900) CLEARANCE TO OBSTRUCTION IS AVAILABLE

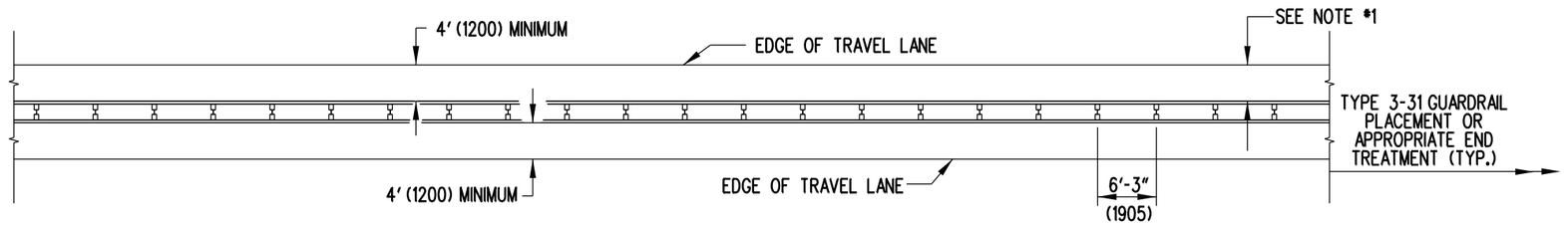


TYPE 2-31 GUARDRAIL

TYPICAL GUARDRAIL TREATMENT
WHEN 2'-0" (600) TO 3'-0" (900) OF CLEARANCE TO OBSTRUCTION IS AVAILABLE



FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1



TYPE 3-31 GUARDRAIL

TYPICAL MEDIAN GUARDRAIL TREATMENT

NOTES :

1). THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL SHOULD BE MAXIMIZED. THIS AREA SHALL BE GRADED 10:1 OR FLATTER.

2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

DELAWARE
DEPARTMENT OF TRANSPORTATION

TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS

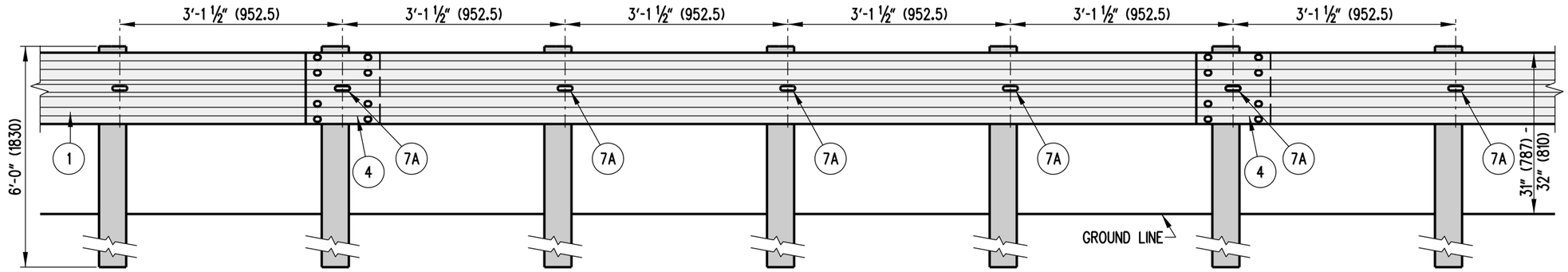
STANDARD NO. B-1 (2010) | **SHT. 1 OF 3**

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

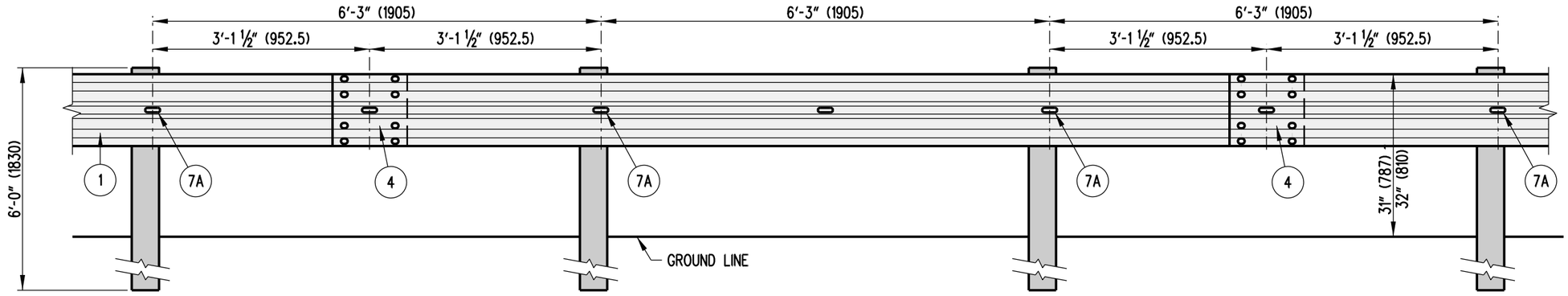
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

12/6/2010

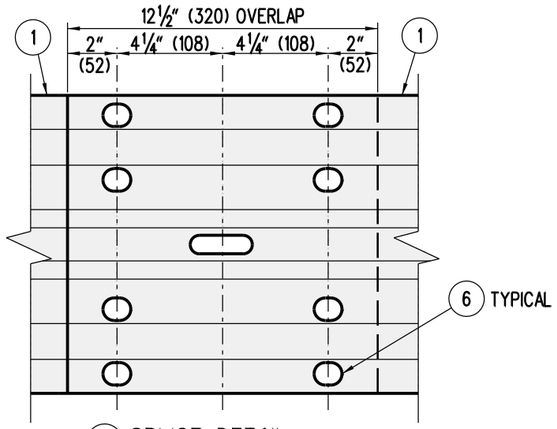
SCALE : N.T.S.



TYPE 2-31



TYPE 1-31 OR 3-31



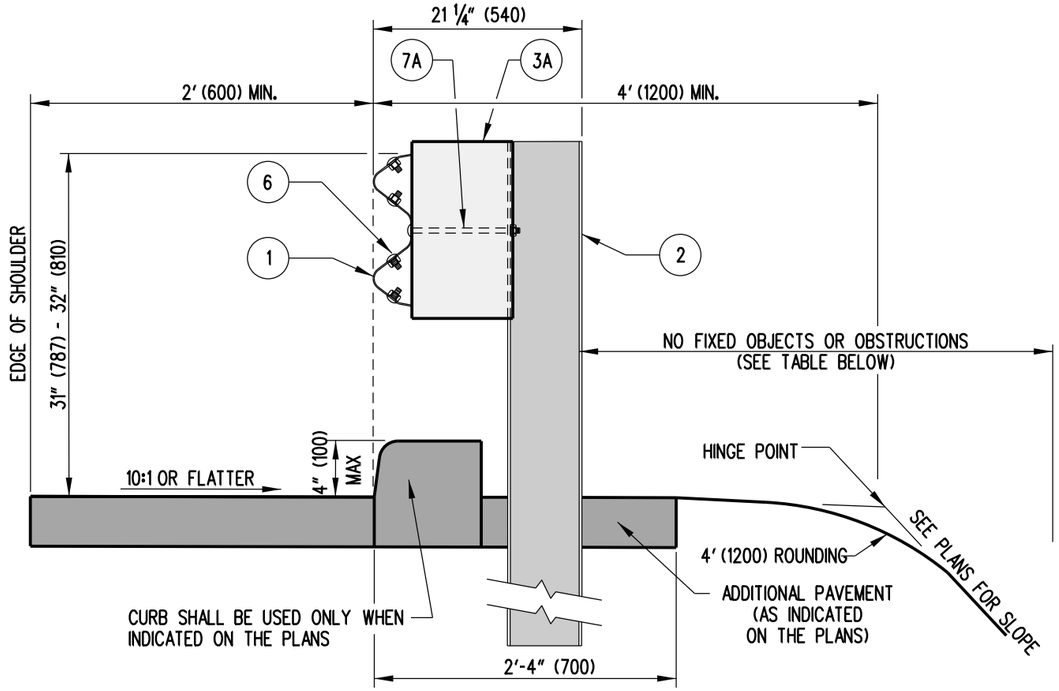
4 SPLICE DETAIL

NOTE : OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.

DELAWARE DEPARTMENT OF TRANSPORTATION	TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-1 (2010) SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/14/2010

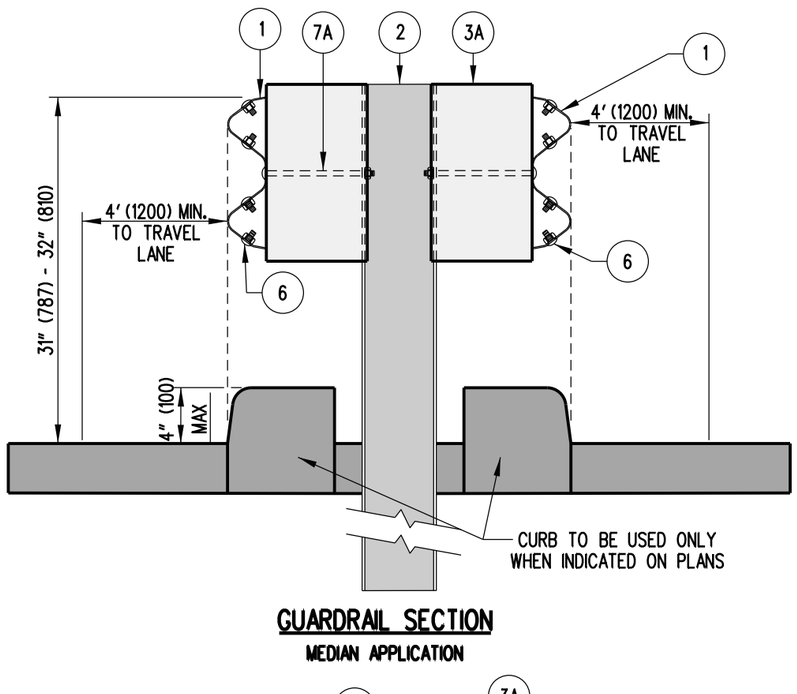
SCALE : N.T.S.



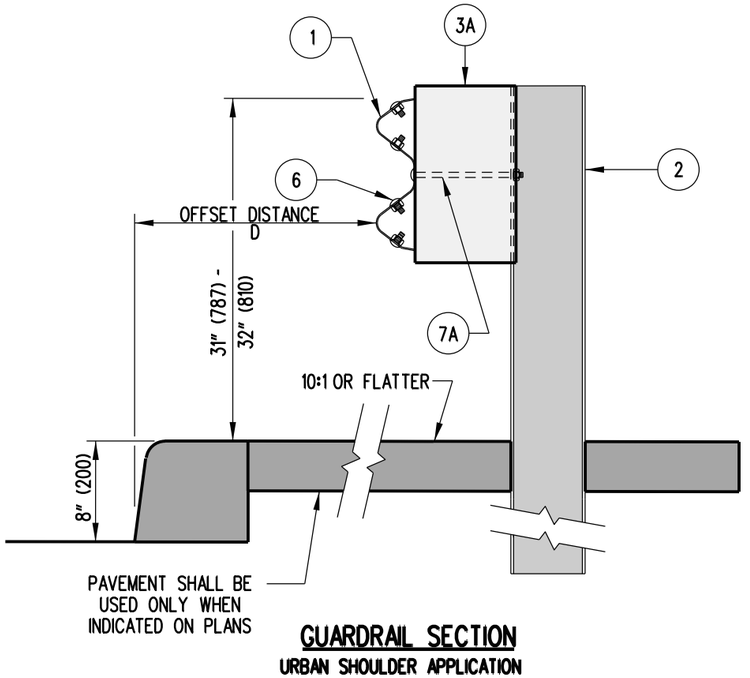
GUARDRAIL SECTION
RURAL SHOULDER APPLICATIOON

TYPE	POST SPACING	CLEAR AREA BEHIND POST
1	6'-3" (1905)	3'-0" (900) MIN
2	3'-1 1/2" (952.5)	2'-0" (600) MIN

DESIGN SPEED	D
< 50 MPH (80 km/h)	8'-0" (2400)
≥ 50 MPH (80 km/h)	13'-0" (3900)



GUARDRAIL SECTION
MEDIAN APPLICATION

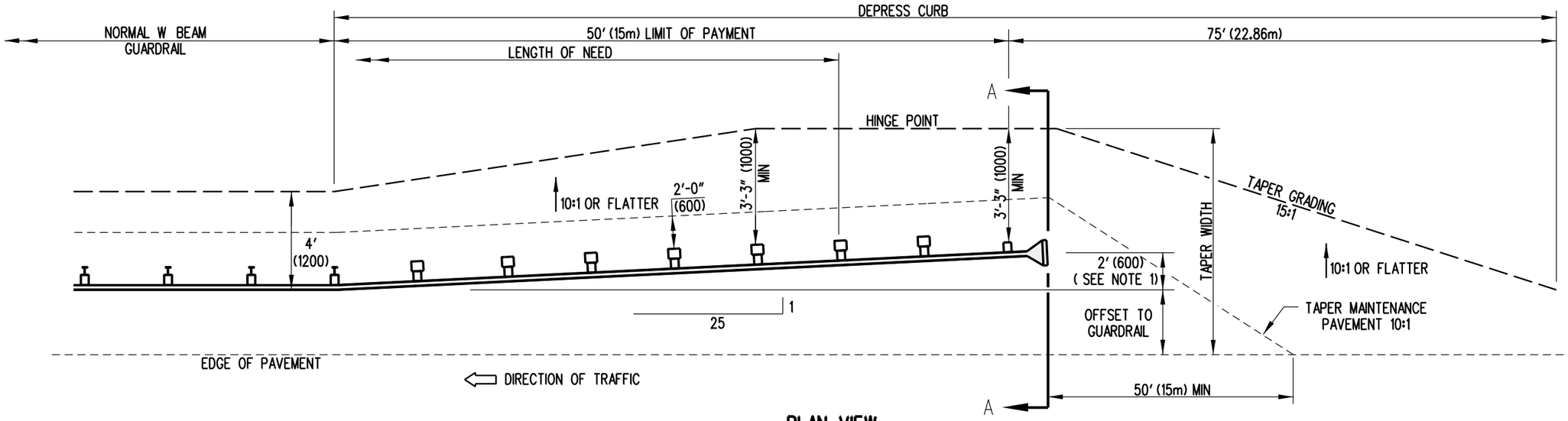


GUARDRAIL SECTION
URBAN SHOULDER APPLICATION

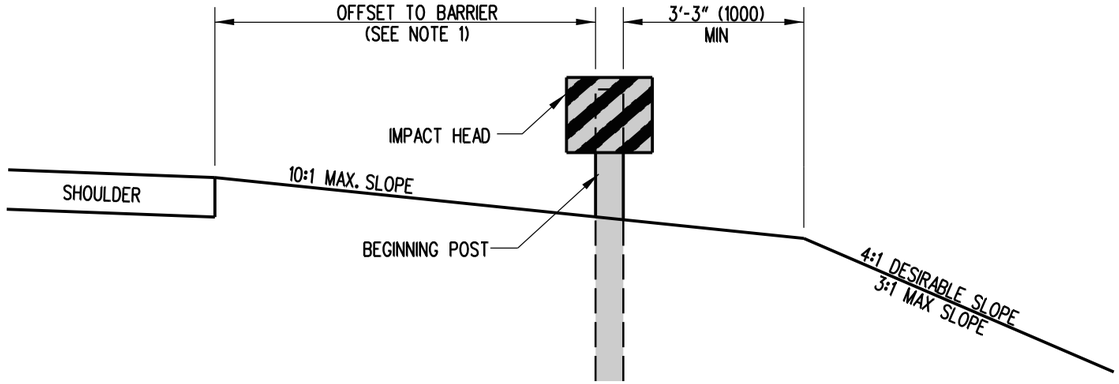
DELAWARE DEPARTMENT OF TRANSPORTATION	TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-1 (2010)	SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/6/2010

SCALE : N.T.S.



PLAN VIEW



SECTION A-A

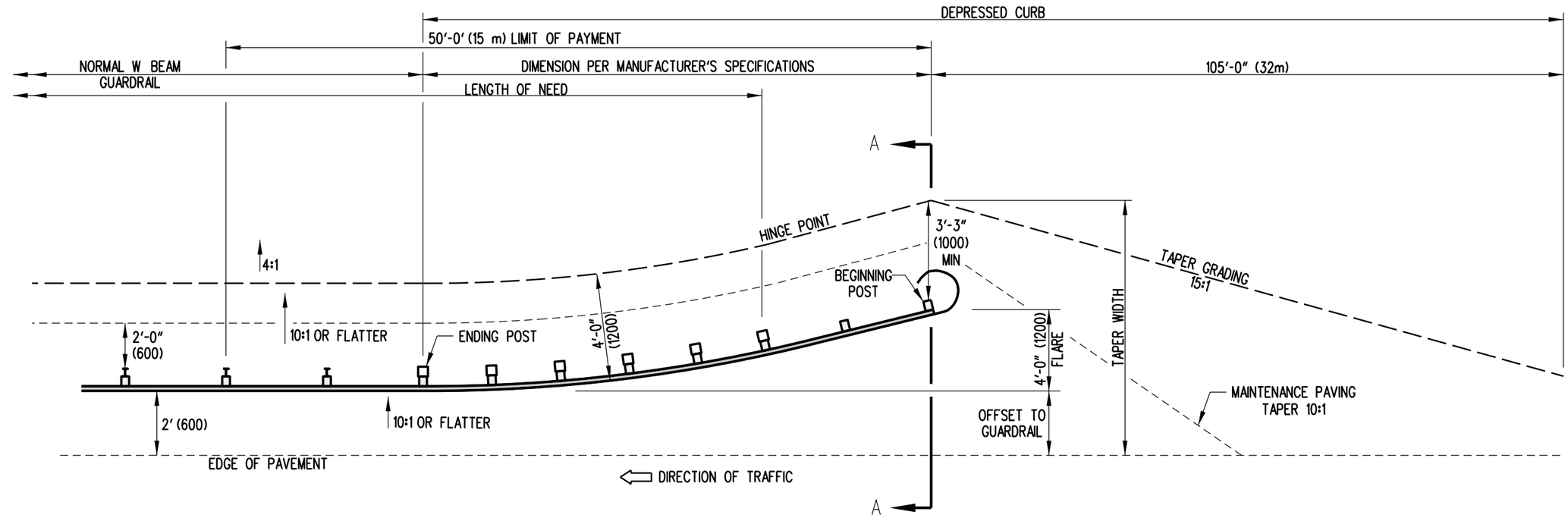
NOTES:

1). FLARE THE END TREATMENT AT 25:1 BEGINNING 50' (15 m) FROM THE END OF THE IMPACT HEAD, UNLESS THE CONSTRUCTION PLANS OR SPECIFICATIONS SPECIFY A SMALLER FLARE.
2). THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS OF THE HEIGHT OF THE GUARDRAIL SYSTEM.
3). THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.
4). IF CURB IS PRESENT, DEPRESS THE CURB TO A MAXIMUM HEIGHT OF 2" (50) WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

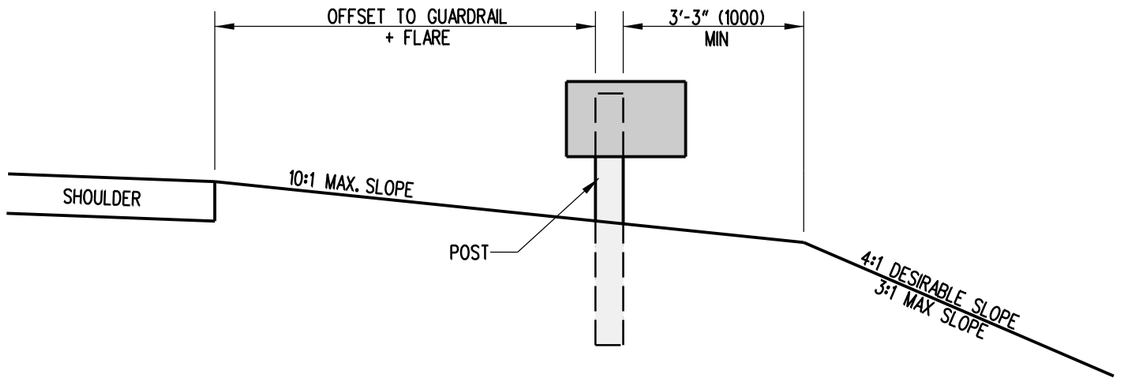
DELAWARE DEPARTMENT OF TRANSPORTATION	**GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1**	**APPROVED** SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-2 (2010) — **SHT. 1 OF 3**	**RECOMMENDED** SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

11/04/2010

SCALE : N.T.S.



PLAN VIEW



SECTION A-A

NOTES:

1). FLARE SHALL BE 4' (1200) UNLESS THE CONSTRUCTION PLANS OR SPECIFICATIONS SPECIFY A SMALLER FLARE. FLARE MAY BE PARABOLIC OR STRAIGHT BASED ON MANUFACTURER'S SPECIFICATIONS.

2). THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS OF THE HEIGHT OF THE GUARDRAIL SYSTEM.

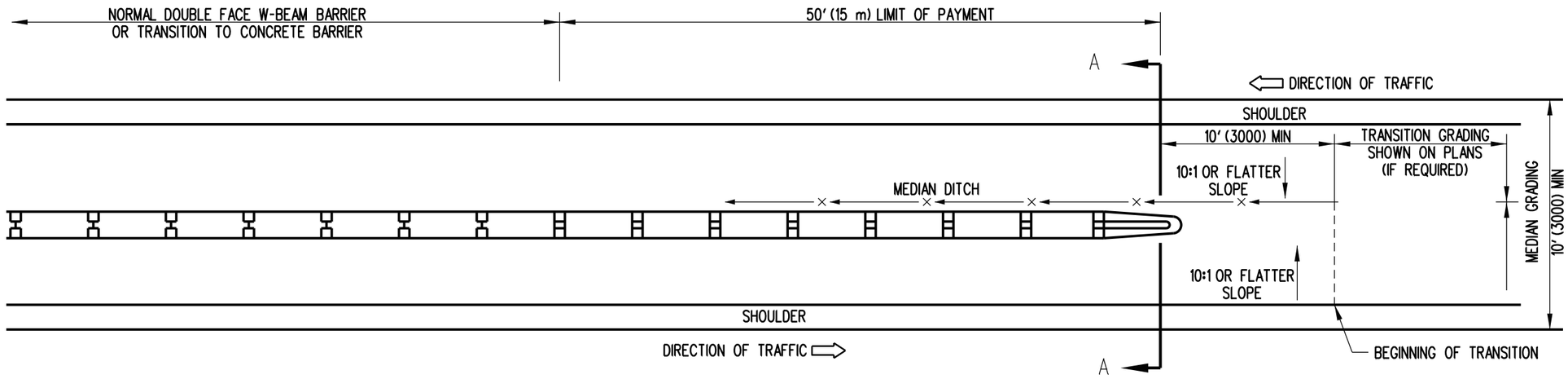
3). THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.

4). IF CURB IS PRESENT, DEPRESS THE CURB TO A MAXIMUM HEIGHT OF 2" (50) WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

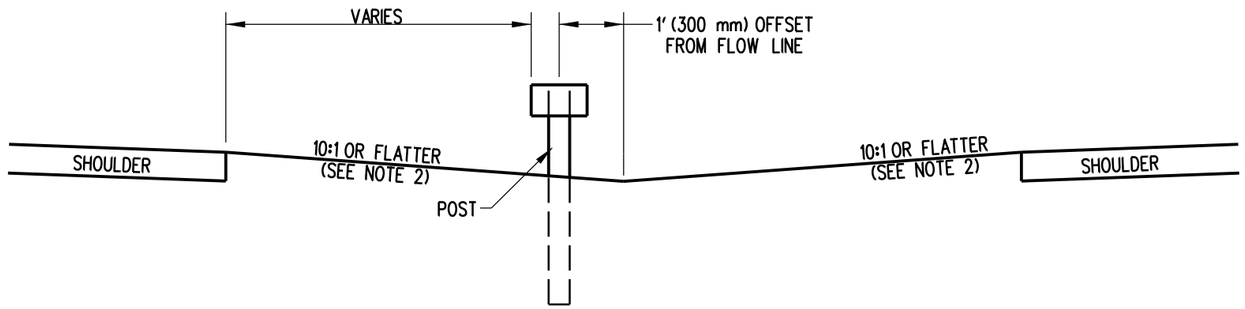
DELAWARE DEPARTMENT OF TRANSPORTATION	GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-2 (2010) SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

11/04/2010

SCALE : N.T.S.



PLAN VIEW



SECTION A-A

GRADING FOR END TREATMENT ATTENUATOR, TYPE 3

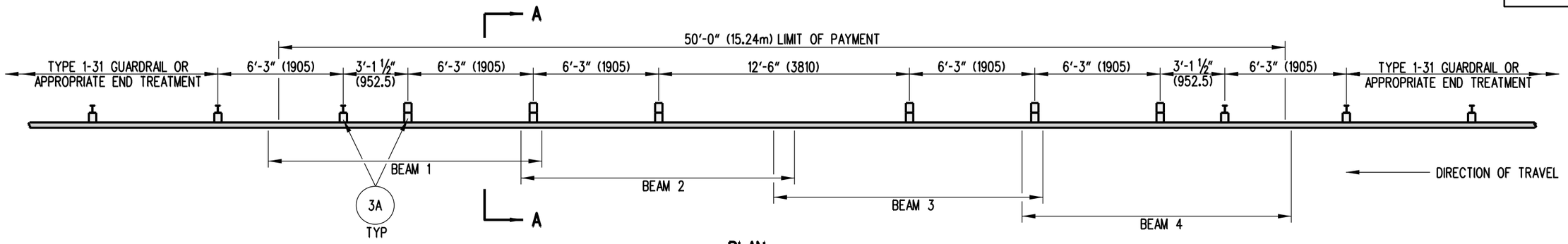
NOTES:

1). THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS OF THE HEIGHT OF THE GUARDRAIL SYSTEM.
2). 6:1 OR FLATTER GRADING IS ALLOWABLE WHEN THE BARRIER IS LOCATED 12' (3.65m) OR MORE FROM THE OUTSIDE EDGE OF THE SHOULDER.
3). THIS END TREATMENT CAN ALSO BE USED IN RAMP GORES OR OTHER AREAS WHERE TWO RAILS OF W-BEAM COME TOGETHER AND TERMINATE WITH ONE END TREATMENT.
4). WHEN OPPOSING ROADWAYS HAVE EQUAL ELEVATIONS THE TRAFFIC BARRIER SYSTEM SHOULD BE PLACED ON THE OPPOSITE SIDE OF THE DITCH LINE FROM APPROACHING TRAFFIC.
5). THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.
6). IF CURB IS PRESENT, DEPRESS THE CURB TO A MAXIMUM HEIGHT OF 2" (50) WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

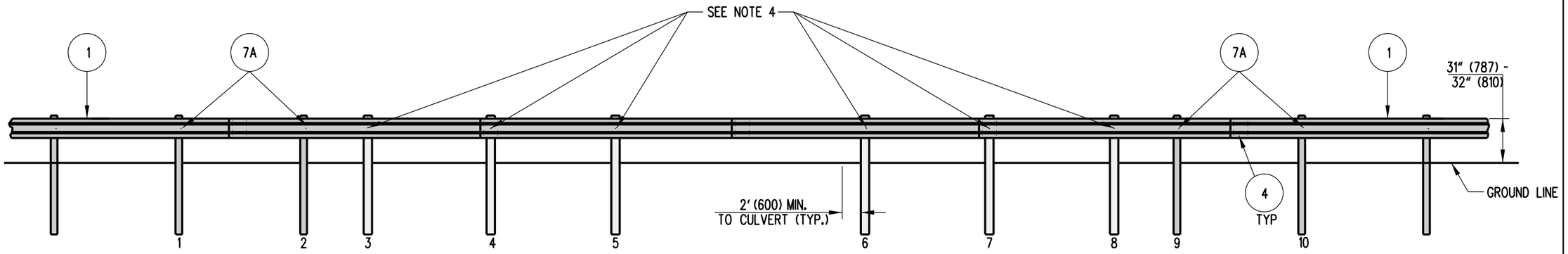
DELAWARE DEPARTMENT OF TRANSPORTATION	GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-2 (2010) SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

SCALE : N.T.S.



PLAN



ELEVATION

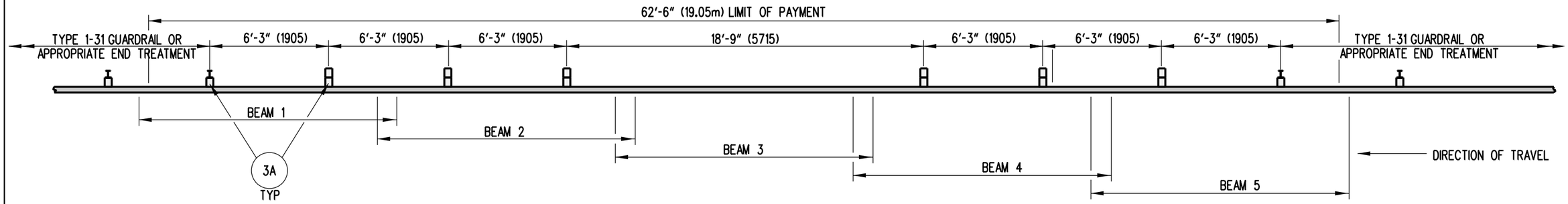
NOTES:

1). ALL W-BEAMS ARE 13'-6½" (4130) IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3). POSTS 1, 2, 9, & 10 ARE TO BE W6x9 (W15x13.5) STEEL POSTS. POSTS 3 THROUGH 8 ARE TO BE TYPE 31 LONG WOOD BREAKAWAY POSTS.
4). THE RAIL SHALL BE ATTACHED AT POSTS 3 THROUGH 8 WITH A ⅝" (16) x 22" (560) GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.

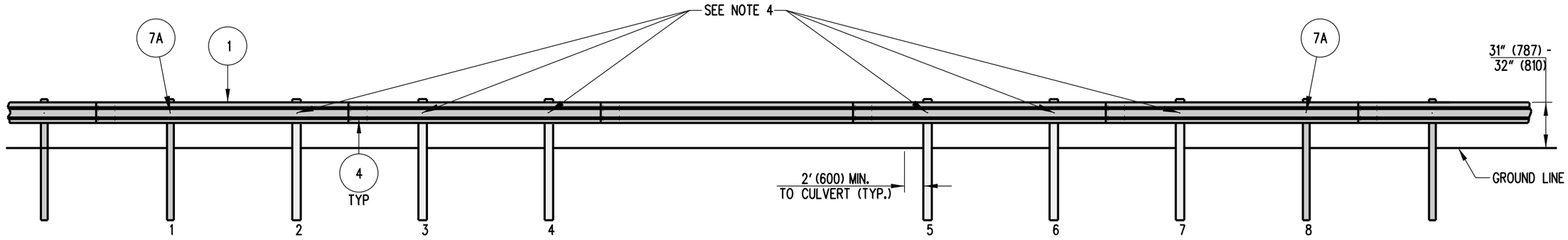
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 1-31		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-3 (2010)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/11/2010

SCALE : N.T.S.



PLAN



ELEVATION

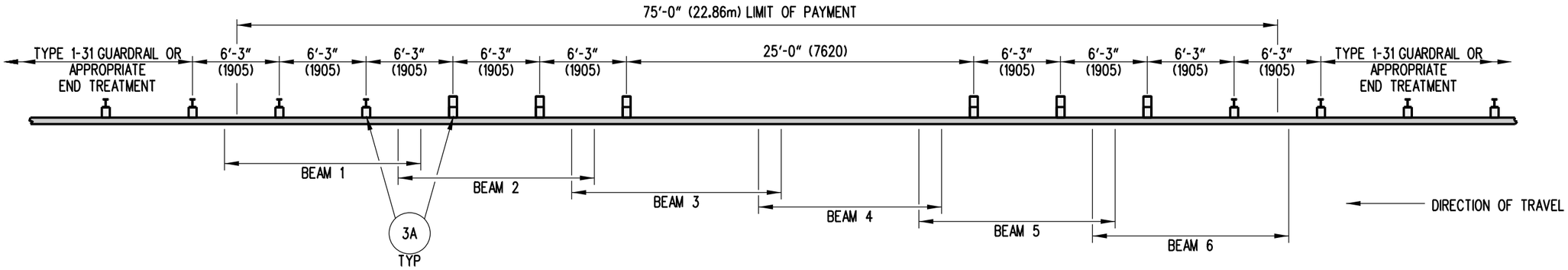
NOTES:

1). ALL W-BEAMS ARE 13'-6½" (4130) IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3). POSTS 1 AND 8 SHALL BE W6x9 (W15x13.5) STEEL POSTS. POSTS 2 THROUGH 7 SHALL BE TYPE 31 LONG WOOD BREAKAWAY POSTS.
4). THE RAIL SHALL BE ATTACHED TO POSTS 2 THROUGH 7 WITH A ⅝" (16) x 22" (560) GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.

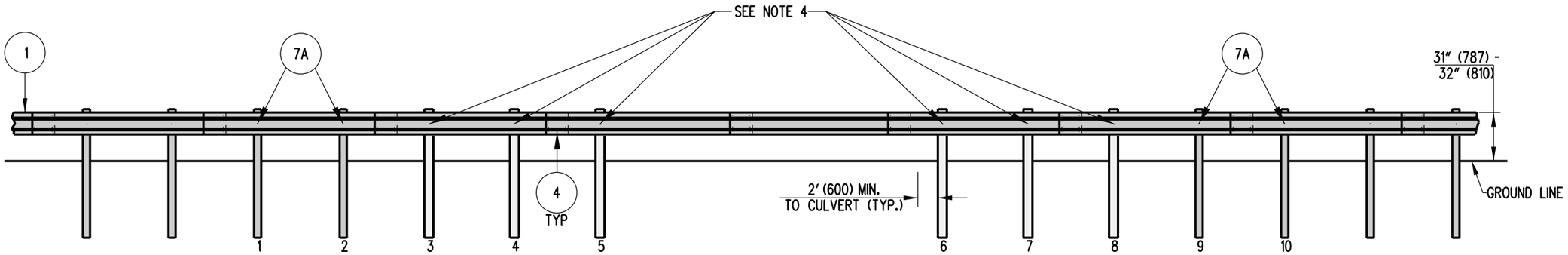
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 2-31	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-3 (2010) — SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/14/2010

SCALE : N.T.S.



PLAN



ELEVATION

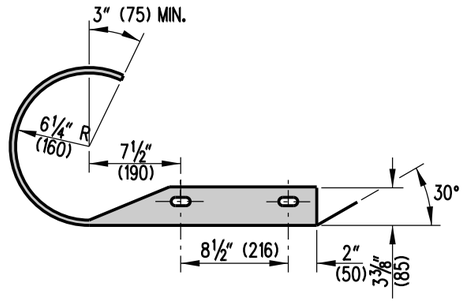
NOTES:

1). ALL W-BEAMS ARE 13'-6½" (4130) IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3). POSTS 1, 2, 9, & 10 ARE TO BE W6x9 (W15x13.5) STEEL POSTS. POSTS 3 THROUGH 8 ARE TO BE TYPE 31 LONG WOOD BREAKAWAY POSTS.
4). THE RAIL SHALL BE ATTACHED AT POSTS 3 THROUGH 8 WITH A ⅝" (16) x 22" (560) GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.

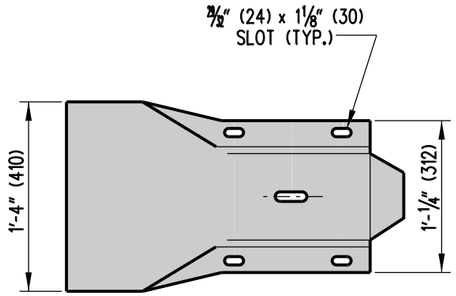
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 3-31	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-3 (2010) SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/14/2010

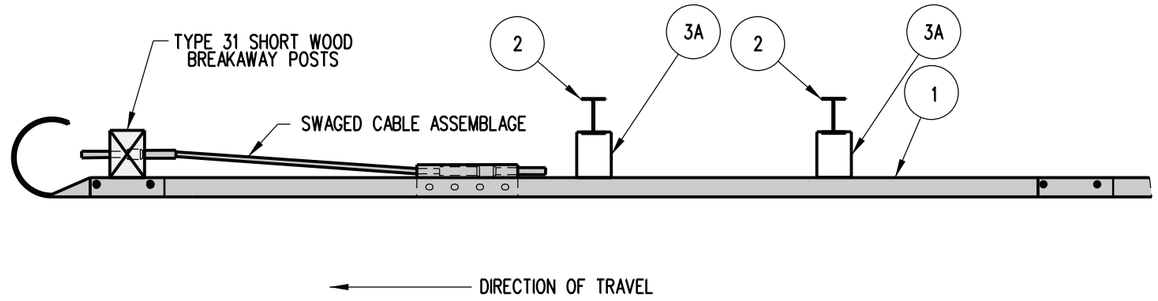
SCALE : N.T.S.



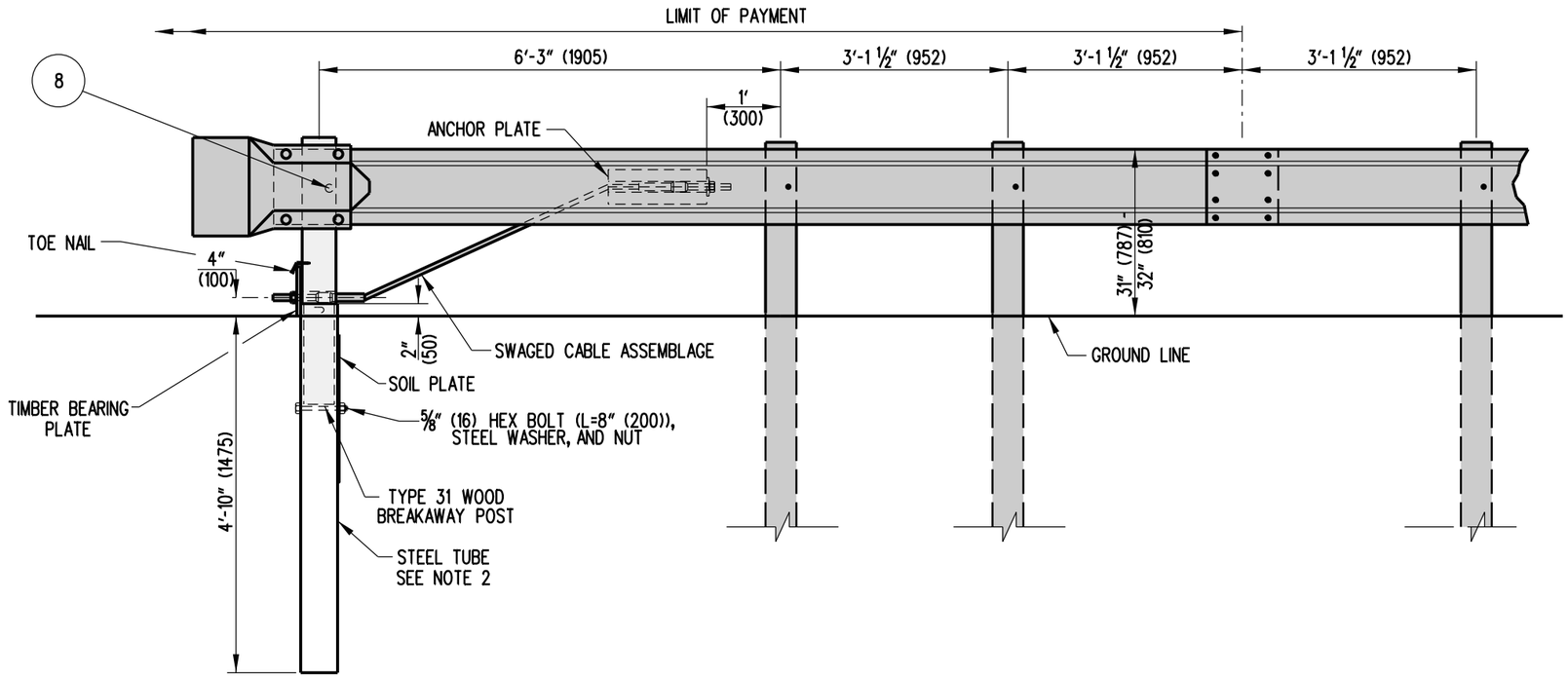
END SECTION PLAN



END SECTION ELEVATION



PLAN



ELEVATION

NOTES:

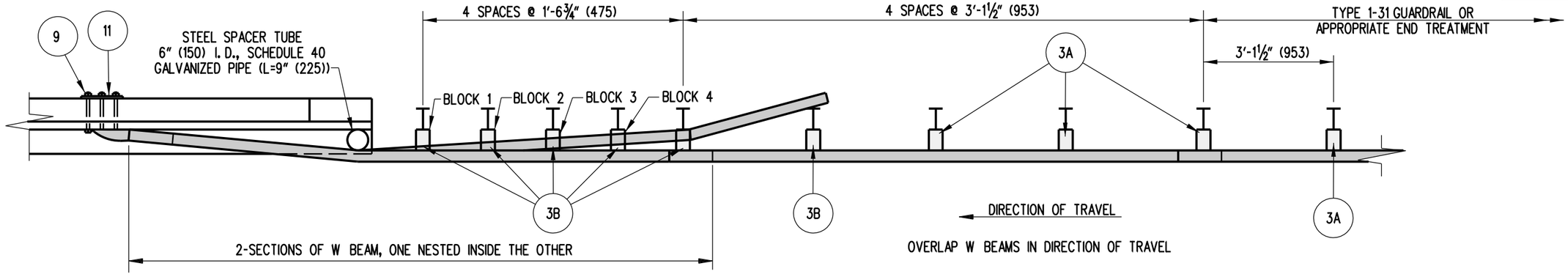
1). ADDITIONAL HOLES FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING. (SEE STANDARD HARDWARE SHEET FOR HOLE SPACING INFORMATION).

2). CONTRACTOR HAS THE OPTION OF USING A 6' (1830) STEEL TUBE WITHOUT A SOIL PLATE OR A 5' (1525) STEEL TUBE WITH A SOIL PLATE.

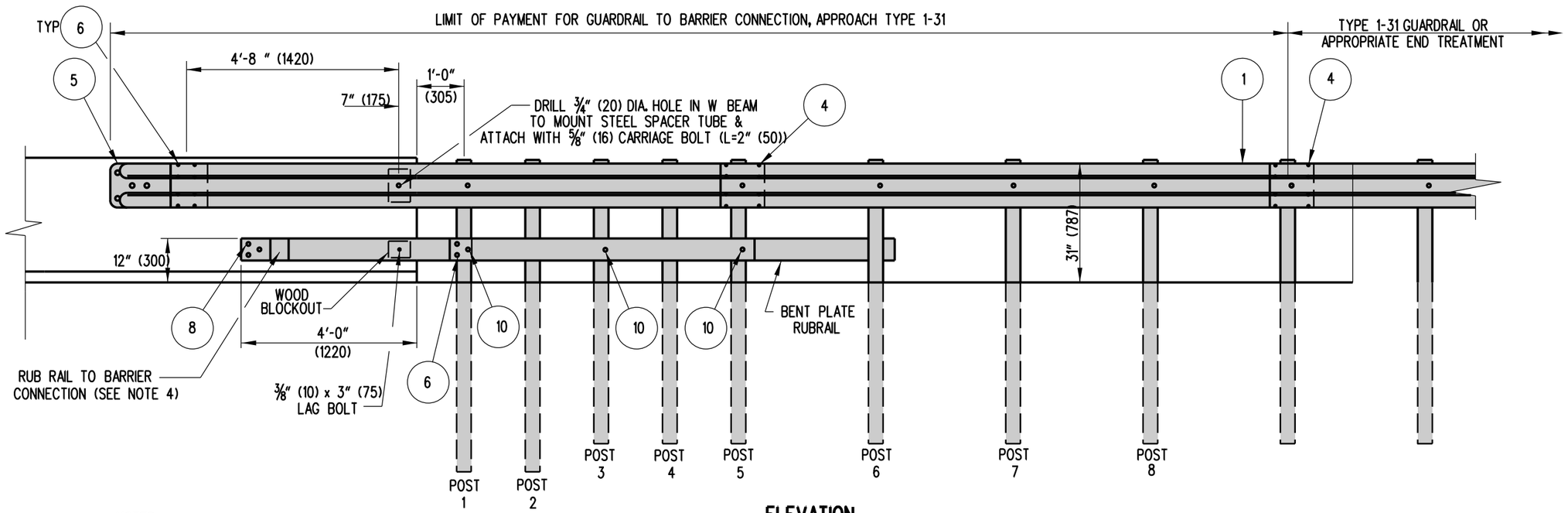
DELAWARE DEPARTMENT OF TRANSPORTATION	END ACHORAGE, TYPE 31		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-4 (2010)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

11/04/2010

SCALE : N.T.S.



PLAN



ELEVATION

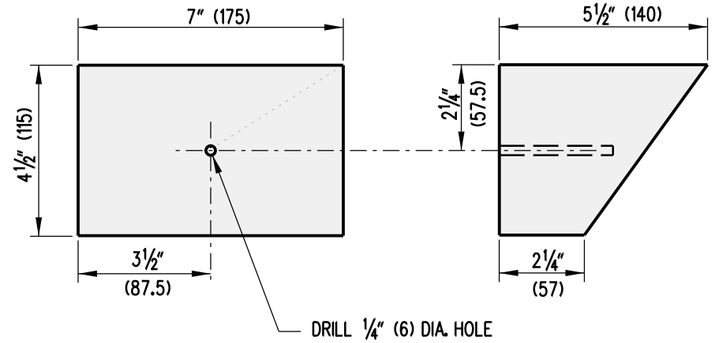
NOTES:

1). DO NOT ATTACH W BEAM TO POSTS 2 THROUGH 4.
2). DO NOT ATTACH RUB RAIL TO POSTS 2 AND 4.
3). POSTS 1 THROUGH 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER OFFSET BLOCKS AND/OR RUBRAIL AND WOOD BLOCK.
4). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR ⅝" (16) BOLT) BETWEEN HEADS AND RUB RAIL.
5). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
6). PLACE GUARDRAIL REFLECTOR AS PER THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
7). APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
8). POSTS 1 & 2 ARE W8x13 (W200x19.3), 7'-6" (2.3m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9 (W150x13.5), 6'-0" (1.82m) LONG.
9). A 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK IS USED AT POSTS 1 THROUGH 6 AND A 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK IS USED AT POSTS 7 THROUGH 9.

DELAWARE DEPARTMENT OF TRANSPORTATION	**GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31**	**APPROVED** SIGNATURE ON FILE (CHIEF ENGINEER)	12/28/2010 (DATE)
	STANDARD NO. B-5 (2010) — **SHT. 1 OF 6**	**RECOMMENDED** SIGNATURE ON FILE (DESIGN ENGINEER)	12/27/2010 (DATE)

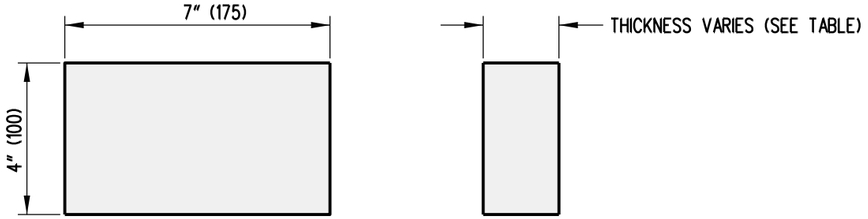
12/06/2010

SCALE : N.T.S.



ELEVATION RIGHT SIDE

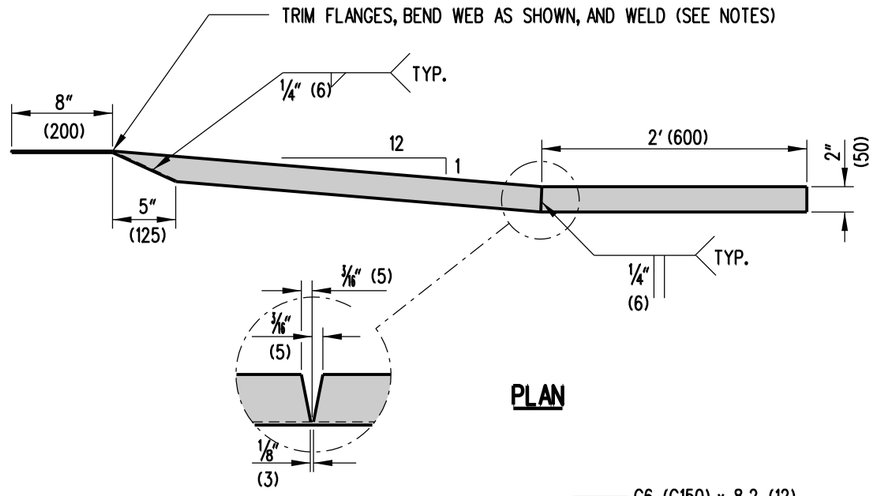
OFFSET BLOCK DETAIL



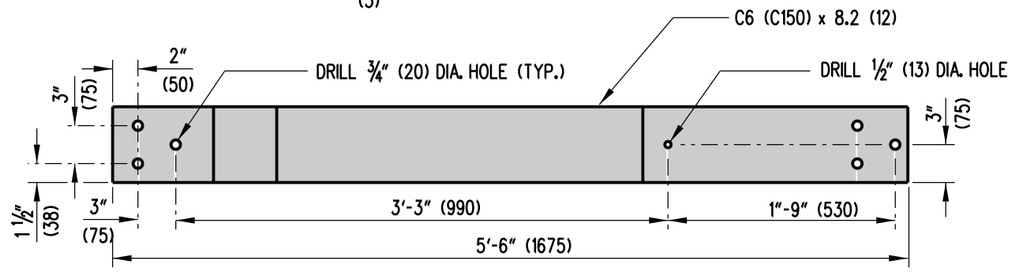
ELEVATION RIGHT SIDE

RUB RAIL OFFSET BLOCKS

RUB RAIL OFFSET BLOCKS (7" (175) x 4" (100))		
POST NO.	THICKNESS	BOLT LENGTH
1	4¼" (108)	6" (150)
2	3¼" (83)	4" (100)
3	2" (50)	4" (100)
4	1" (25)	2" (50)



PLAN



ELEVATION

RUB RAIL TO BARRIER CONNECTION

NOTES:

1). THE RUB RAIL TO BARRIER CONNECTION END MUST BE ATTACHED FLUSH WITH THE SLOPED TOE OF THE SAFETY BARRIER. INSTALLATION CAN BE SIMPLIFIED BY FABRICATING OR SHOP TWISTING THE RUB RAIL END TO BE CONSISTENT WITH THE SLOPE OF THE BARRIER, HOWEVER, FIELD BENDING USING HEAT IS PERMITTED.
2). STEEL SPACER TUBE IS SCHEDULE 40 GALVANIZED PIPE, 6" (150) x 9" (225)
3). ALL HARDWARE ON THIS DETAIL IS COMPATIBLE WITH GUARDRAIL TO BARRIER CONNECTION, TYPES 1-31 AND 1-27.

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, TYPE 1 HARDWARE

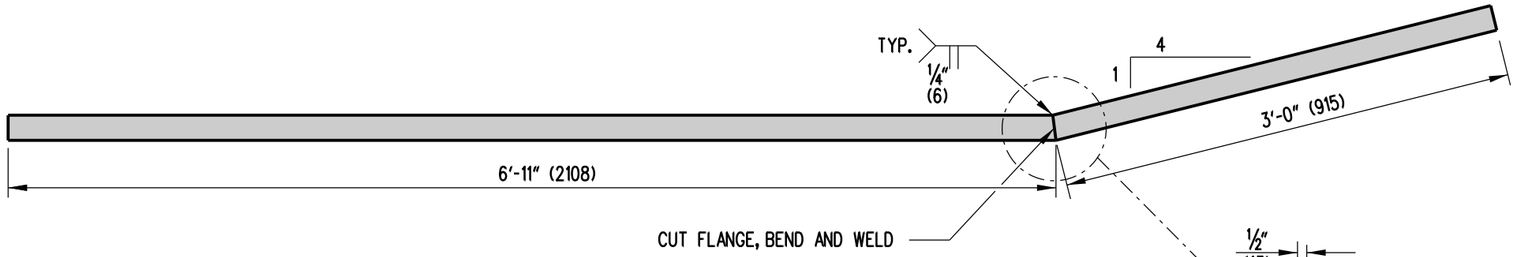
STANDARD NO. B-5 (2010) SHT. 2 OF 6

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

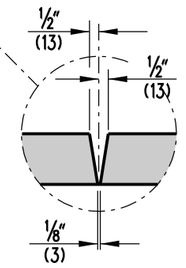
12/06/2010

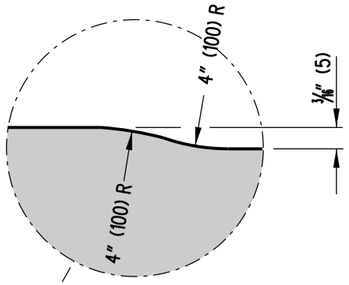
SCALE : N.T.S.

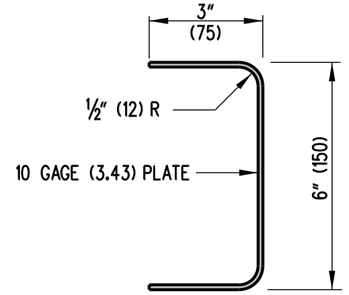


PLAN

SCALE: 1"=1'-0"

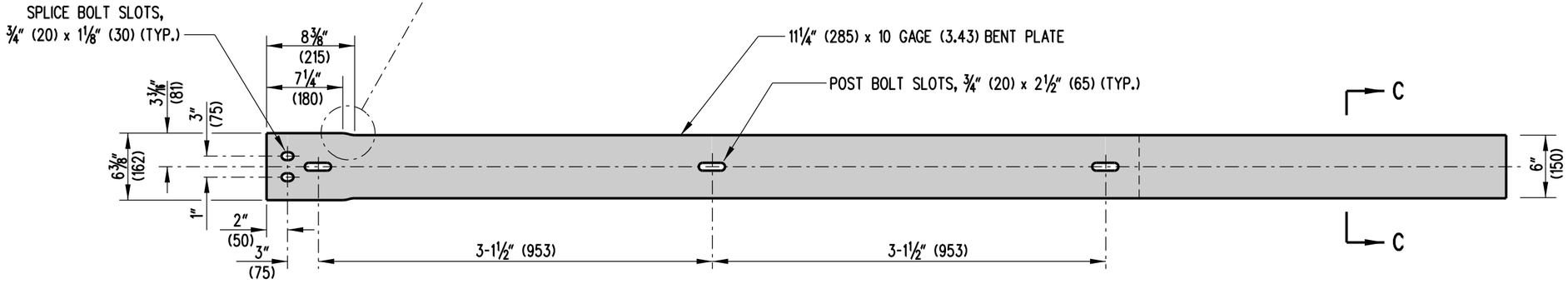






SECTION C-C

SCALE: 3" = 1'-0"



ELEVATION

SCALE: 1"=1'-0"

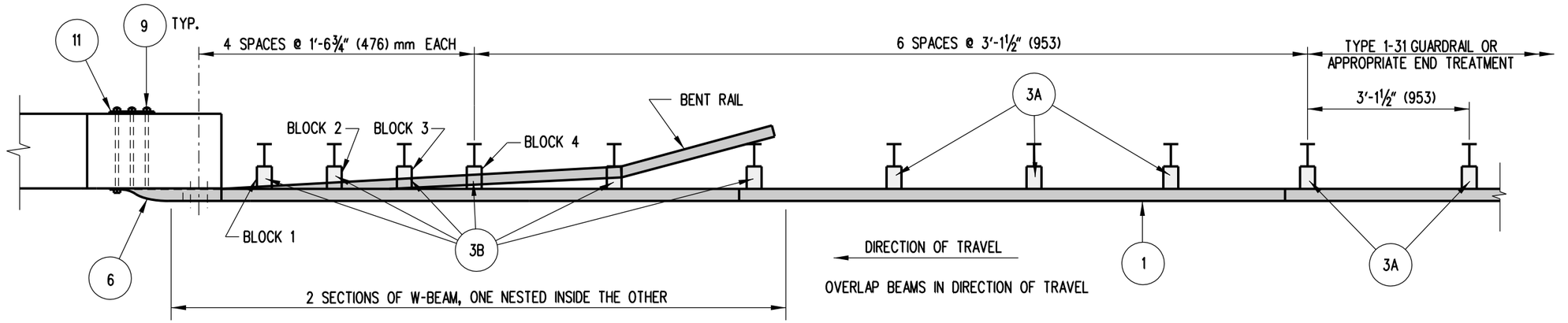
NOTE:

ALL HARDWARE ON THIS DETAIL IS COMPATIBLE WITH GUARDRAIL TO BARRIER CONNECTION, TYPES 1-31 AND 1-27.

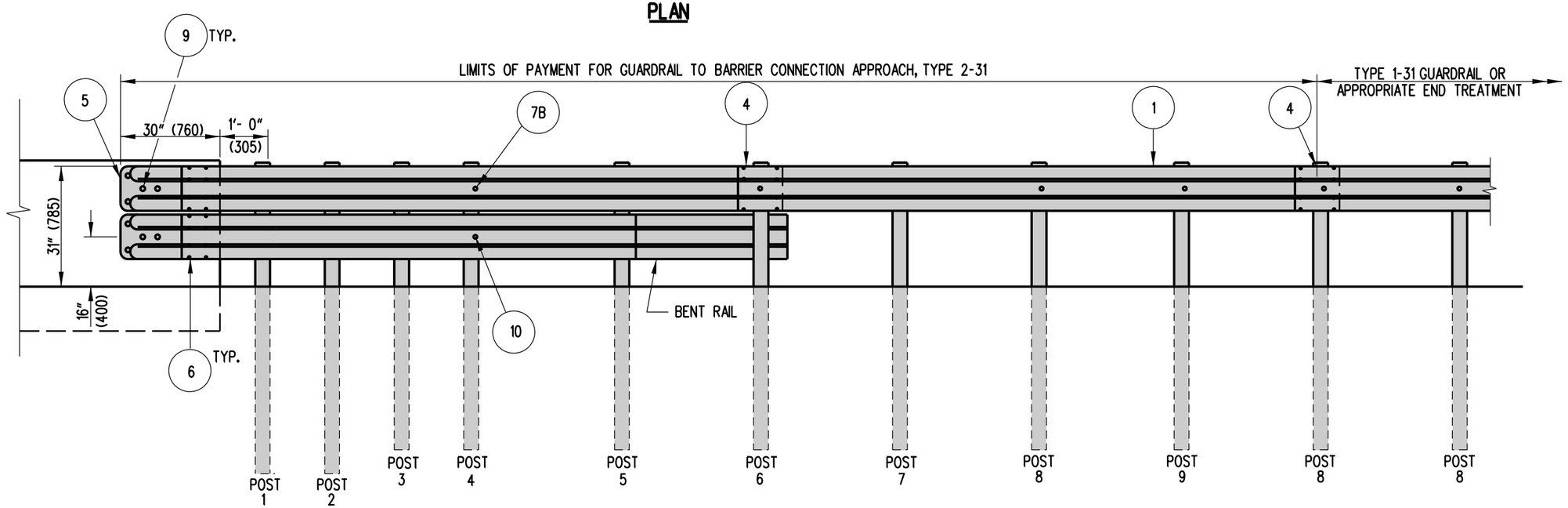
DELAWARE DEPARTMENT OF TRANSPORTATION	**GUARDRAIL TO BARRIER CONNECTION, BENT PLATE RUB RAIL**	**APPROVED** SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-5 (2010) **SHT. 3 OF 6**	**RECOMMENDED** SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

SCALE : N.T.S.



PLAN



ELEVATION

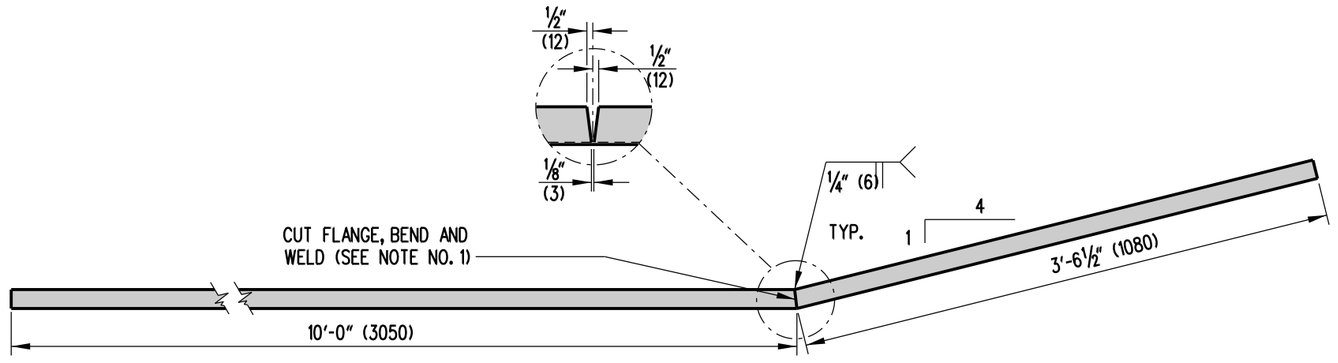
NOTES :

1). CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
2). POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH OFFSET BLOCKS AND/OR BENT RAIL.
3). DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
4). POSTS 1 AND 2 ARE W8x13 (W200x19.3), 7'-6" (2.28m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9 (w150x13.5), 6'-0" (1.82m) LONG.
5). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
6). BENT RAIL MAY BE SHOP BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
7). APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
8). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
9). FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
10). A 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK IS USED AT POSTS 1 THROUGH 6 AND A 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK IS USED AT POSTS 7 THROUGH 9.

DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, APPROACH, TYPE 2-31		APPROVED SIGNATURE ON FILE CHIEF ENGINEER — 12/28/2010 DATE
	STANDARD NO. B-5 (2010)	SHT. 4 OF 6	RECOMMENDED SIGNATURE ON FILE DESIGN ENGINEER — 12/27/2010 DATE

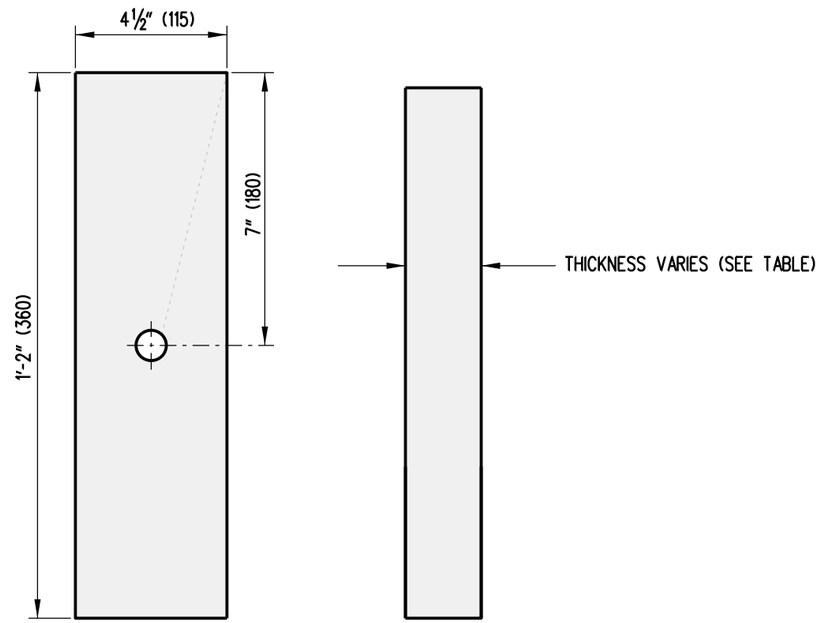
12/06/2010

SCALE : N.T.S.



BENT RAIL

SCALE:1"=1'-0"



ELEVATION RIGHT SIDE

BENT RAIL OFFSET BLOCKS

SCALE: 3"=1'-0"

BENT RAIL OFFSET BLOCKS
1'-2" (360) x 4½" (115)

BLOCK	THICKNESS	BOLT LENGTH
1	5" (125)	8" (200)
2	4" (100)	6" (150)
3	3" (75)	6" (150)
4	2" (50)	4" (100)

NOTES:
1). BOTTOM OFFSET BLOCKS LOCATED ON POSTS 1-4 ARE OFFSET DRILLED TO SIT SQUARELY ON THE POST FLANGE AND SECURED WITH ⅝" (16) CARRIAGE BOLTS. SEE BENT RAIL OFFSET BLOCK TABLE FOR BOLT LENGTH.
2). ALL HARDWARE ON THIS DETAIL IS COMPATIBLE WITH GUARDRAIL TO BARRIER CONNECTION, TYPES 2-31 AND 2-27.

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, TYPE 2 HARDWARE

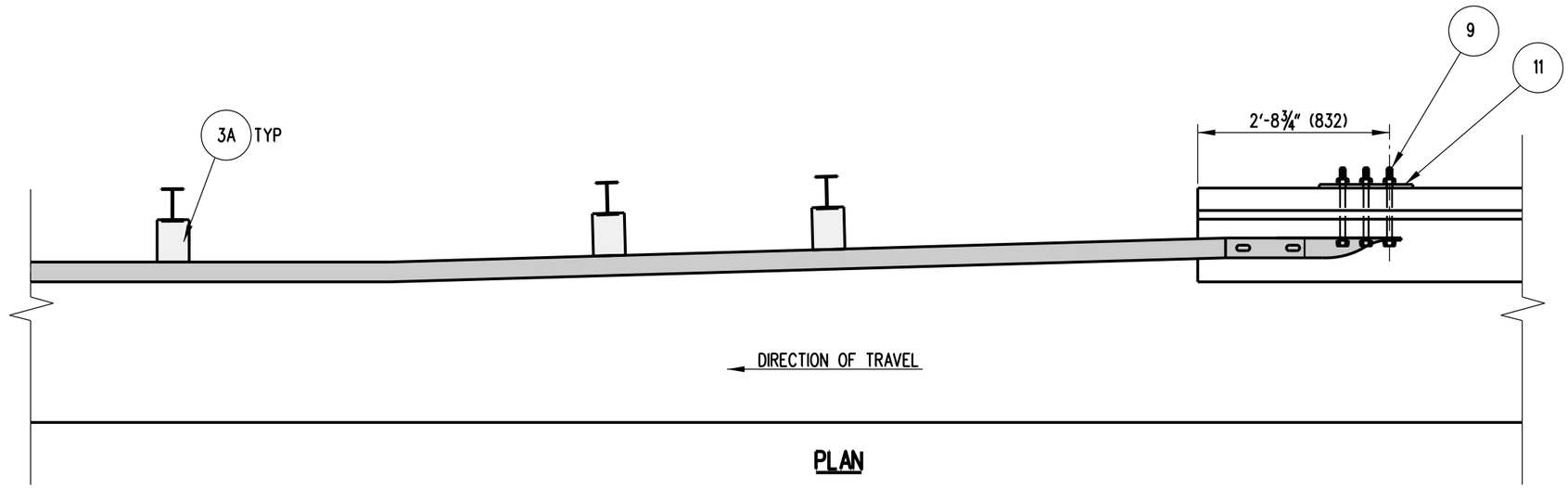
STANDARD NO. B-5 (2010) | SHT. 5 OF 6

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

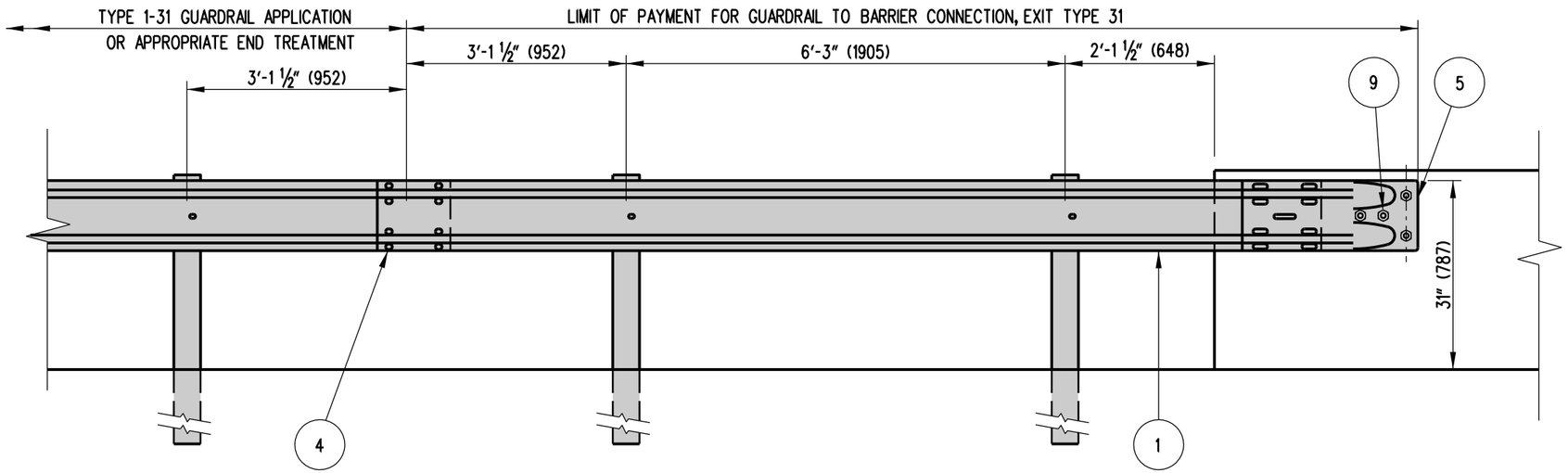
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/15/2010

SCALE : N.T.S.



PLAN



ELEVATION

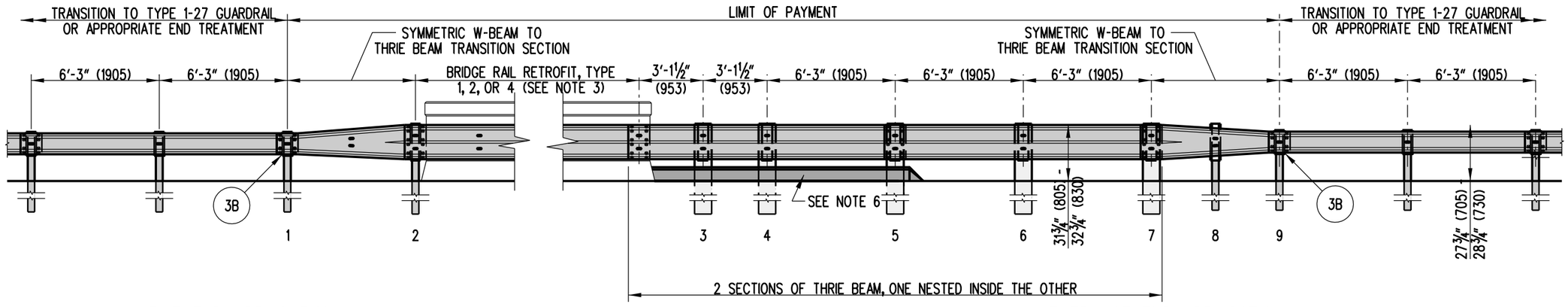
NOTES:

1). CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
2). GUARDRAIL SECTION AND TERMINAL CONNECTIONS SHALL BE OVERLAPPED IN THE DIRECTION OF TRAVEL.
3). INSTALLATION SHOWN ABOVE WITH AN 'F-TYPE' BARRIER FACE. GUARDRAIL SECTION OF BARRIER CONNECTION SHALL BE ADJUSTED HORIZONTALLY IN ORDER TO MEET FLUSH AGAINST VARIOUS TYPES OF WALLS AND BARRIERS.

DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 31		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-5 (2010)	SHT. 6 OF 6	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

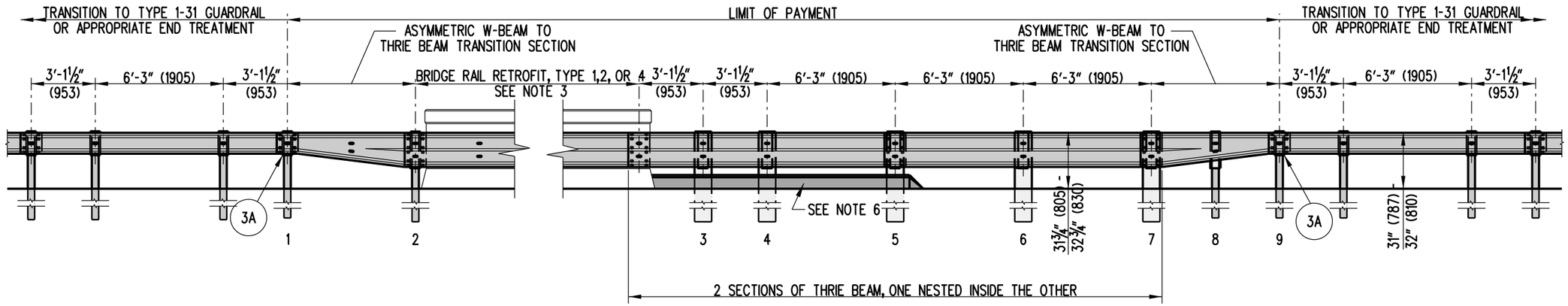
11/04/2010

SCALE : N.T.S.



EXIT END APPLICATION **ENTRANCE END APPLICATION**

27" GUARDRAIL



EXIT END APPLICATION **ENTRANCE END APPLICATION**

31" GUARDRAIL

NOTES:

1). POSTS 1, 2, 8, & 9 ARE W6 x 9 (W150 X 13.5), 6'-0" (1.89m) LONG, STEEL POSTS AND POSTS 3 THRU 7 ARE 10" (250) x 10" (250) X 6'-6" (1980) TIMBER POSTS.
2). POSTS 2 THRU 8 HAVE STANDARD THRIE BEAM OFFSET BLOCKS. POSTS 1 & 9 HAVE STANDARD W-BEAM OFFSET BLOCKS.
3). SEE DETAIL B-6, SHEETS 4 & 5 OF 5 FOR NOTES PERTAINING TO THE BRIDGE RAIL RETROFIT SECTIONS.
4). THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER CONDITIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.
5). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR ⅝" (16) BOLT) BETWEEN BOLT HEADS AND RUBRAIL.
6). PLACE P.C.C. CURB, TYPE 1, STARTING AT PARAPET WALL AND TERMINATING AFTER POST 5. TAPER CURB TO FLUSH AT A 1:1 RATIO.

DELAWARE DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS

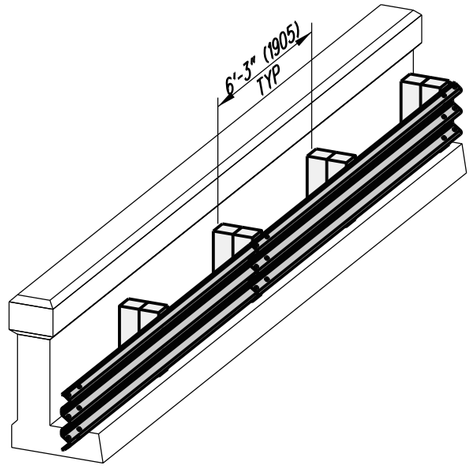
STANDARD NO. B-6 (2010) **SHT. 1 OF 5**

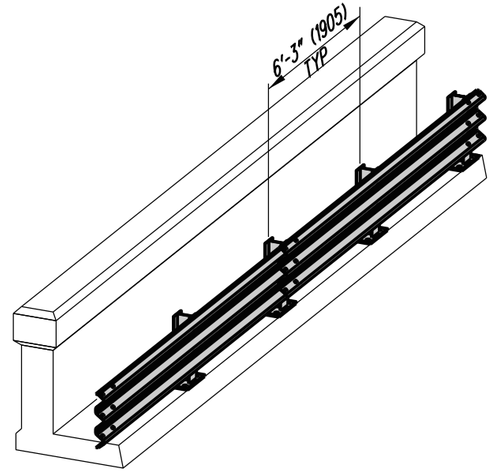
APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

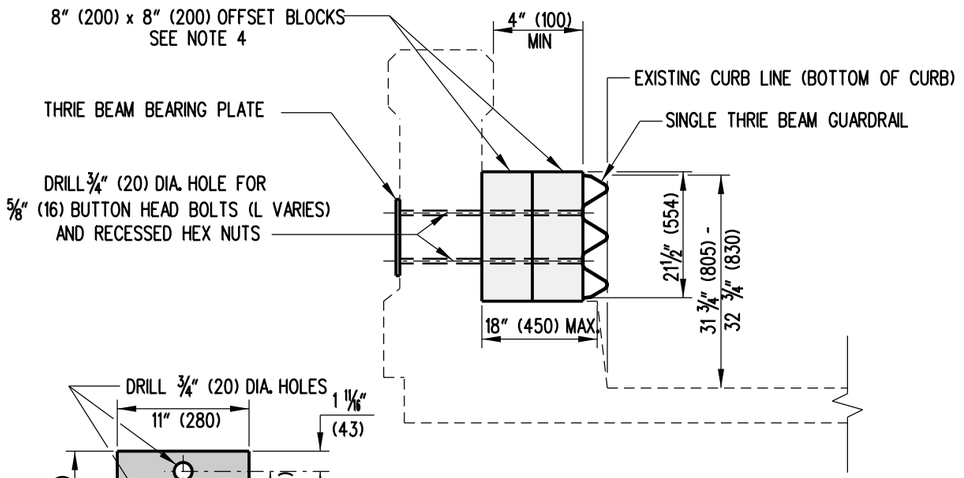
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

12/06/2010

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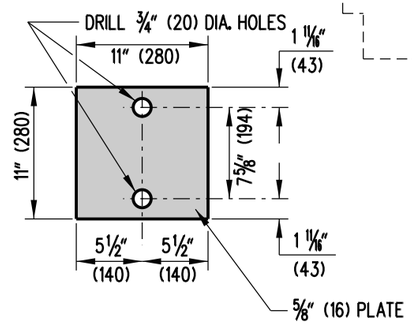




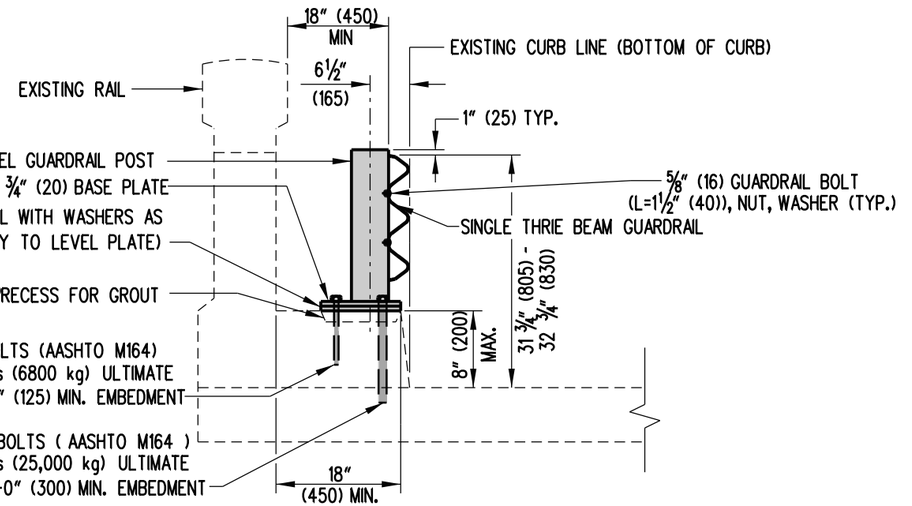


BRIDGE RAIL RETROFIT, TYPE 1

SEE NOTE 1



THRIE BEAM BEARING PLATE DETAIL



BRIDGE RAIL RETROFIT, TYPE 2

SEE NOTE 2

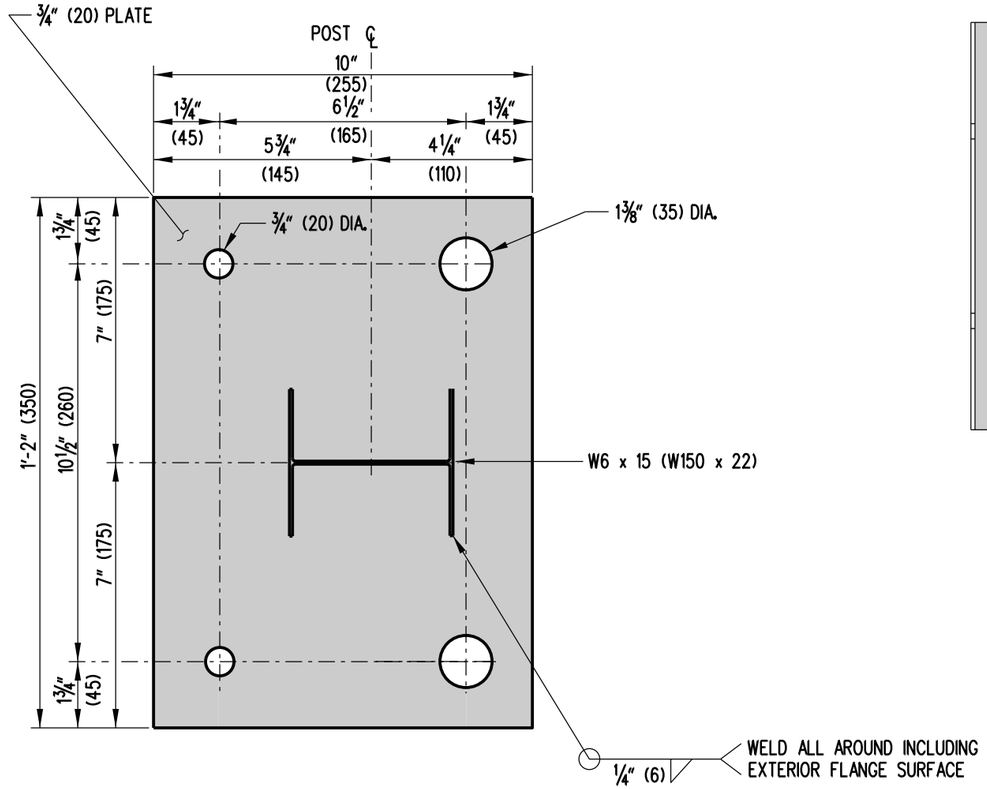
NOTES:

1). BRIDGE RAIL RETROFIT, TYPE 1 SHALL BE USED WHEN THE PARAPET MONOLITHIC CURB IS 18" (450) OR LESS.
2). BRIDGE RAIL RETROFIT, TYPE 2 SHALL BE USED WHEN THE PARAPET MONOLITHIC CURB IS 18" (450) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3 (SEE DETAIL B-6, SHEET 4 OF 5 FOR DETAILS).
3). ADHESIVE ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE GALVANIZED.
4). OFFSET BLOCK THICKNESS SHALL BE ADJUSTED TO ALLOW THE FACE OF THE THRIE BEAM TO BE FLUSH WITH THE BOTTOM OF THE CURB (MINIMUM THICKNESS SHALL BE 4' (100).
5). SEE DETAIL B-6, SHEET 3 OF 5 FOR BRIDGE RAIL RETROFIT, TYPE 2 HARDWARE DETAILS.
6). TYPICAL LATERAL SPACING OF OFFSET BLOCKS OR STEEL POSTS THROUGHOUT THE BRIDGE RAIL SECTION SHALL BE 6'-3" (1905). HOWEVER, SPACING MAY NEED TO BE REDUCED TO ACCOMODATE LINING UP BLOCKS OR POSTS AT THE END OF THE PARAPET.
7). USE A THRIE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
8). PLACE GUARDRAIL DELINEATORS IN THE UPPER VALLEY OF THE THRIE BEAM AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
9). SEE DETAIL B-6, SHEET 1 OF 5 FOR ENTRANCE AND END APPLICATION DETAILS.

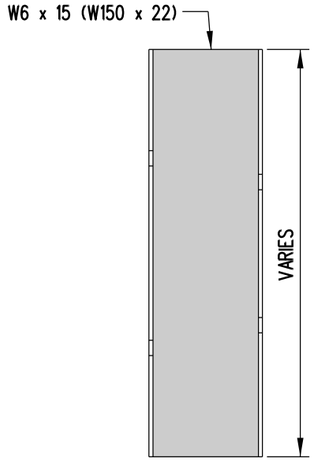
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPES 1 & 2		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010)	SHT. 2 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/06/2010

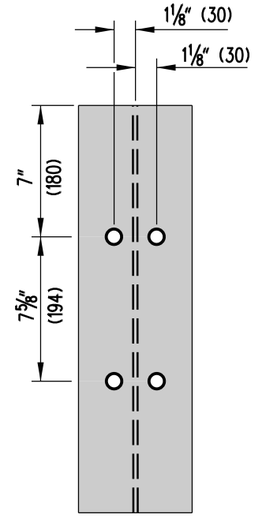
SCALE : N.T.S.



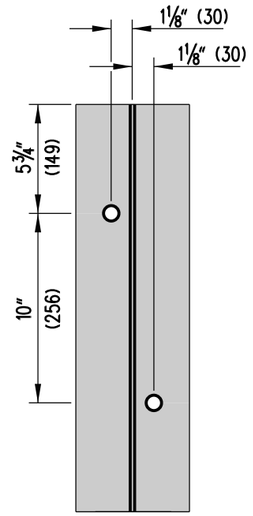
BASE PLATE DETAIL



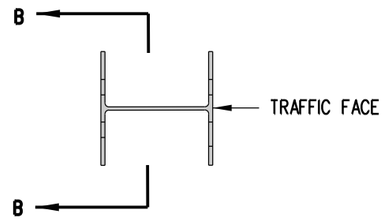
SIDE



FRONT



SECTION B-B



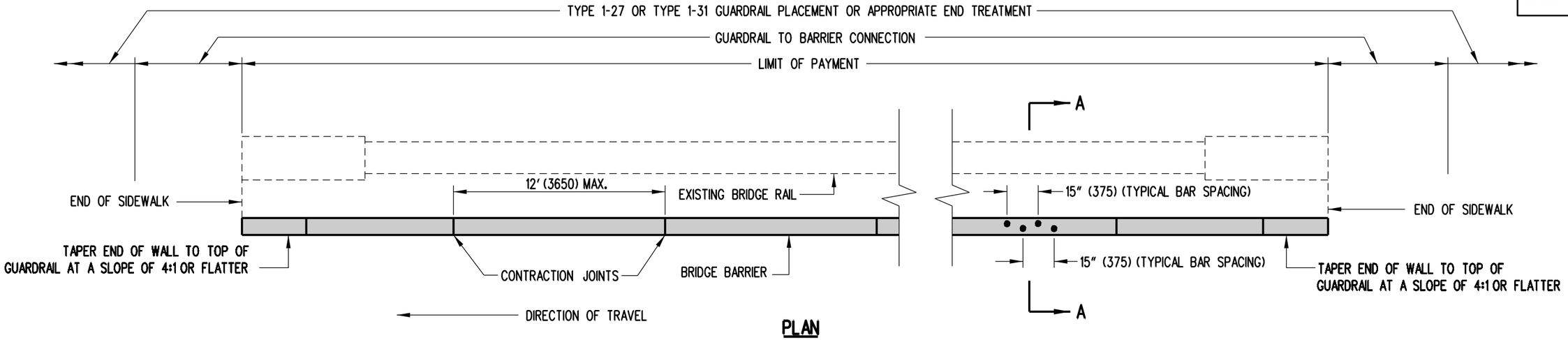
PLAN

W6 x 15 (W150 x 22) STEEL GUARDRAIL POST

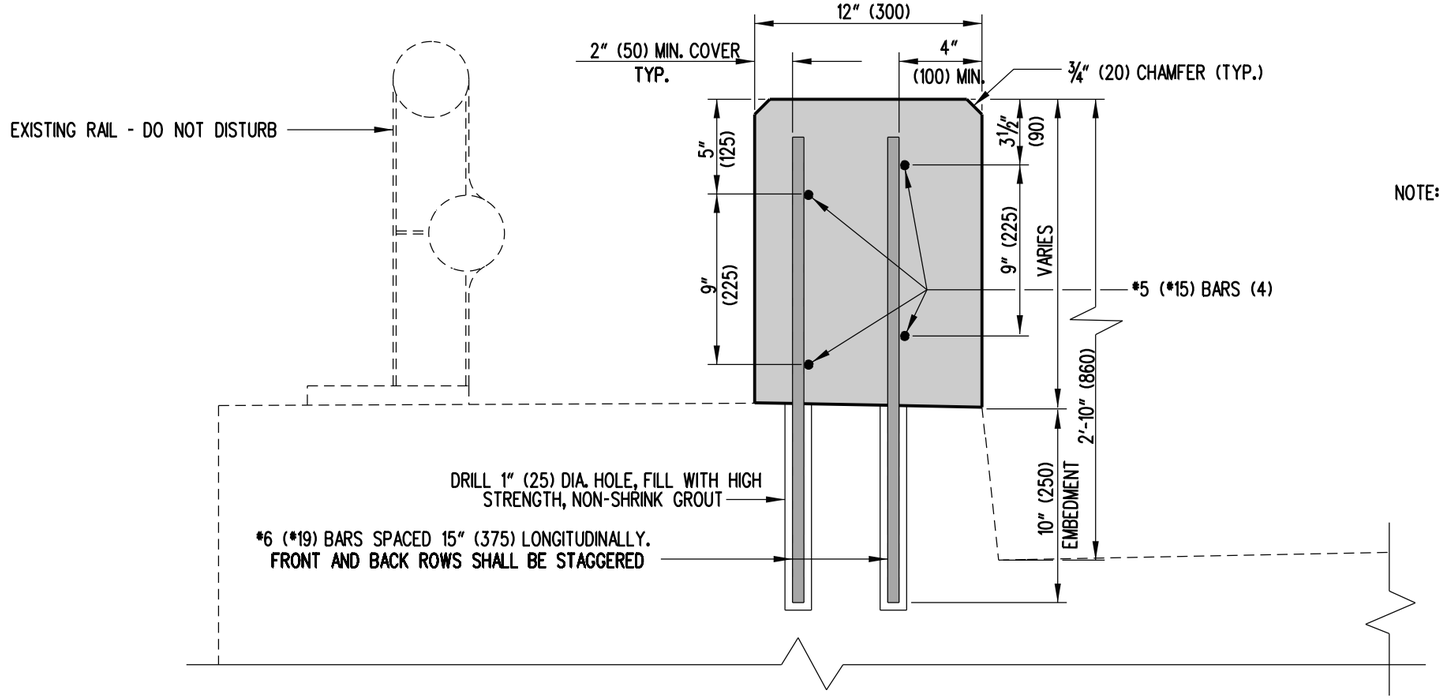
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPE 2 HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010)	SHT. 3 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/16/2010

SCALE : N.T.S.



PLAN



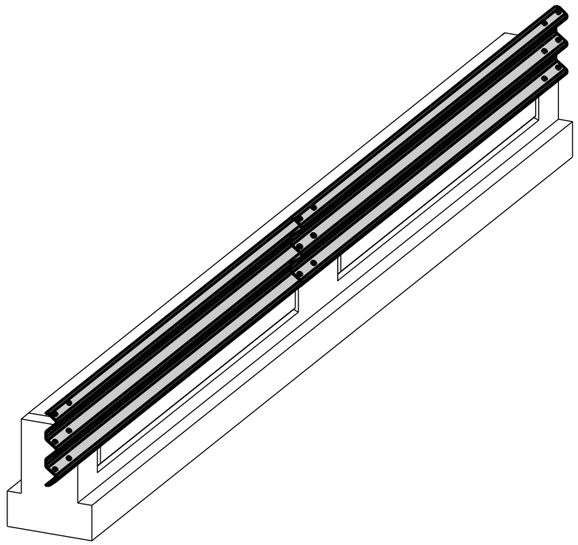
SECTION A-A

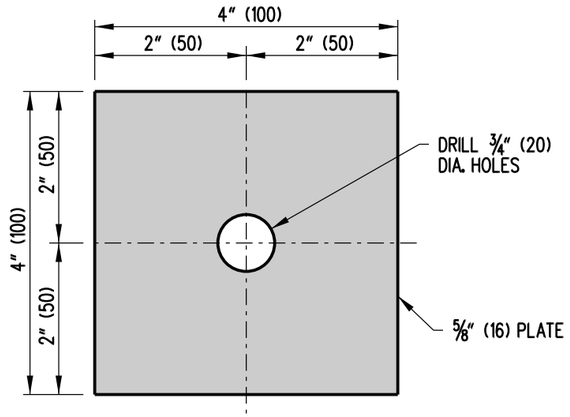
NOTE: STANDARD GUARDRAIL TO BARRIER CONNECTIONS SHALL BE CONNECTED TO THE ENDS OF THE NEW BRIDGE BARRIER AND TRANSITIONED TO THE EXISTING GUARDRAIL.

DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPE 3		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010)	SHT. 4 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

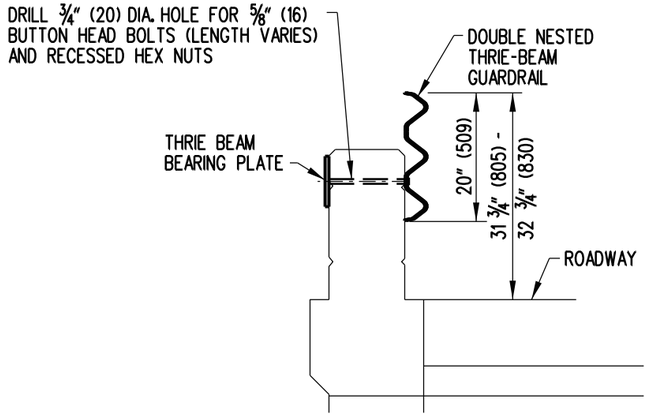
12/06/2010

SCALE : N.T.S.





THRIE-BEAM BEARING PLATE DETAIL



SECTION VIEW

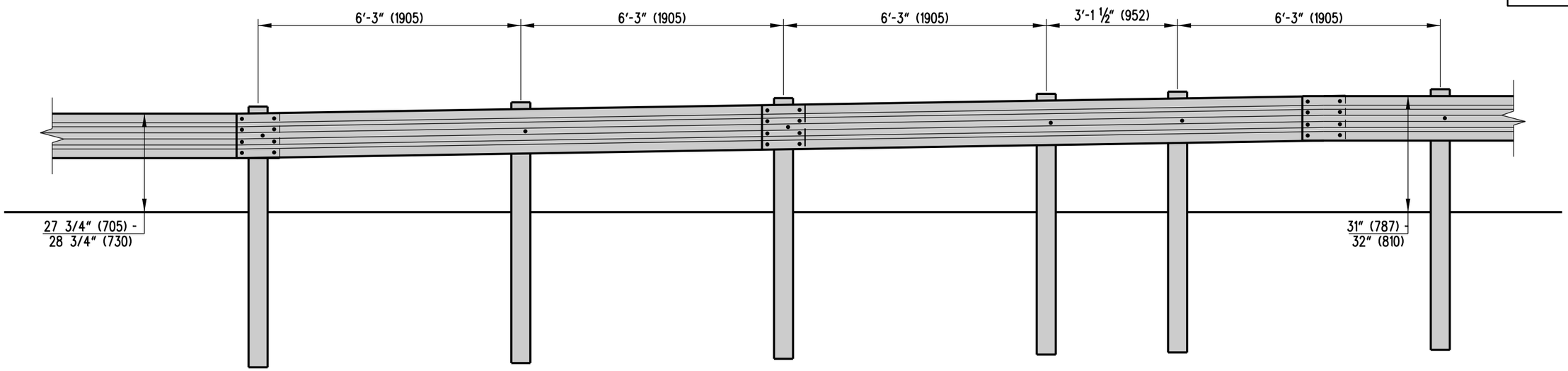
NOTES:

1). BRIDGE RAIL RETROFIT, TYPE 4 SHALL BE USED WHEN THE EXISTING PARAPET HEIGHT IS BETWEEN 22" (559) AND 26" (660).
2). USE A THRIE-BEAM EXPANSION ELEMENT AT BRIDGE EXPANSION JOINTS.
3). PLACE GUARDRAIL DELINEATORS IN THE UPPER VALLEY OF THE THRIE-BEAM AT THE INTERVAL SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4). SEE DETAIL B-6, SHEET 1 OF 5 FOR ENTRANCE AND EXIT APPLICATION DETAILS AND NOTES.
5). SPACING OF WOOD POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
6). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR ⅝" (16) BOLT) BETWEEN BOLT HEADS AND RUBRAIL.
7). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

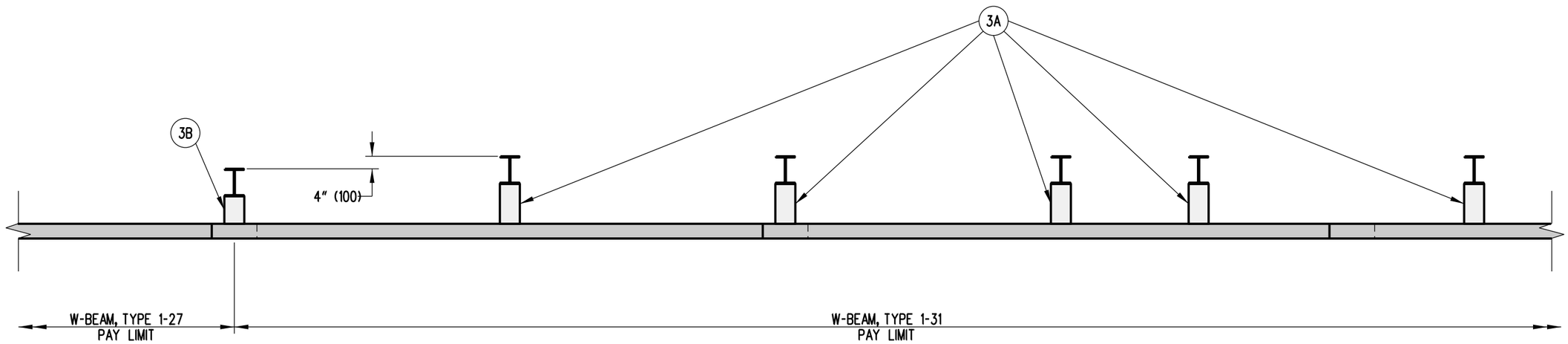
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPE 4	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010) SHT. 5 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/06/2010

SCALE : N.T.S.



ELEVATION

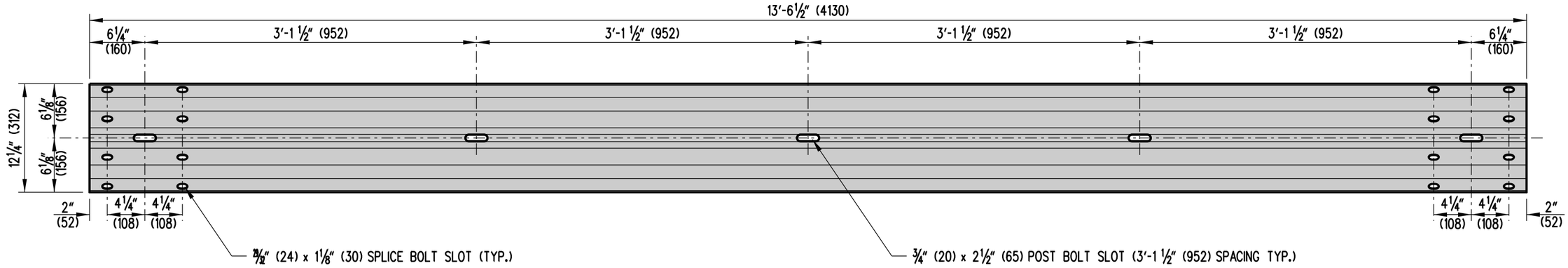


PLAN

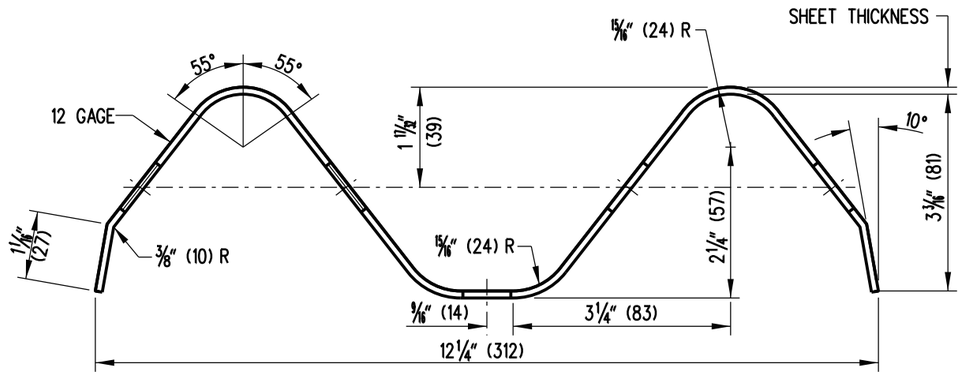
DELAWARE DEPARTMENT OF TRANSPORTATION	W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-7 (2010) — SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/16/2010

SCALE : N.T.S.



W-BEAM ELEVATION



W-BEAM SECTION

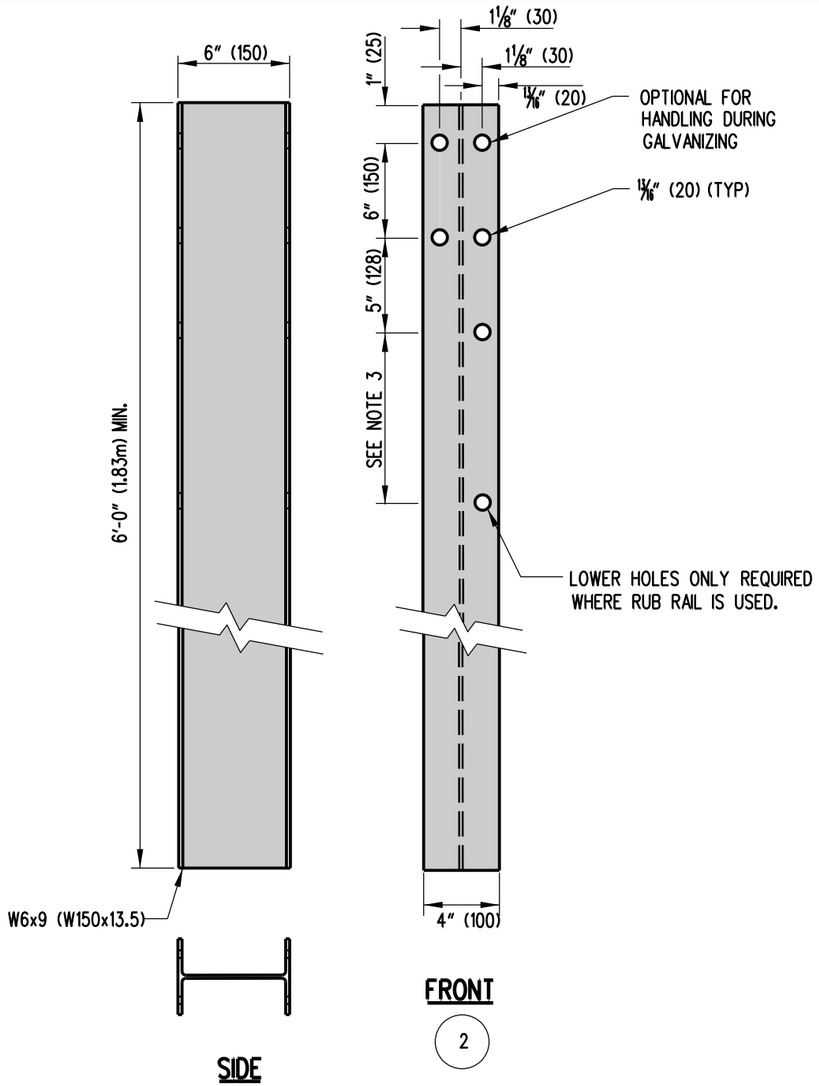
NOTE:

1). FOUR ADDITIONAL ¾" (20) x 2½" (65) SLOTS SHALL BE PROVIDED AT 3'-1 ½" (952) SPACING FOR A 26'-½" (7940) BEAM LENGTH.

DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 1 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

SCALE : N.T.S.

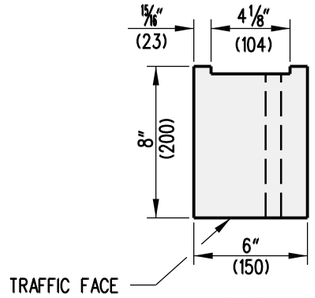


SIDE

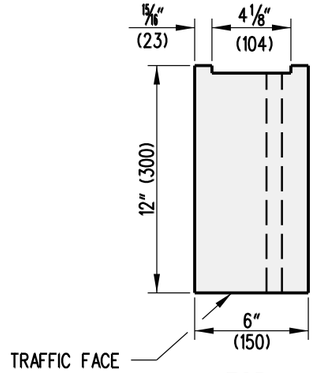
FRONT

2

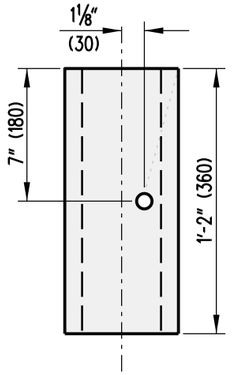
POST



TOP



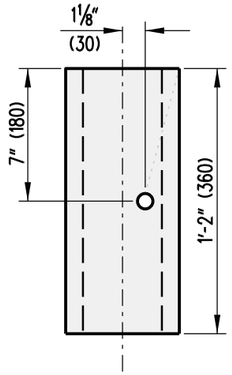
TOP



FRONT

OFFSET BLOCK, TYPE 27

3B



FRONT

OFFSET BLOCK, TYPE 31

3A

W-BEAM STEEL POST AND OFFSET BLOCK

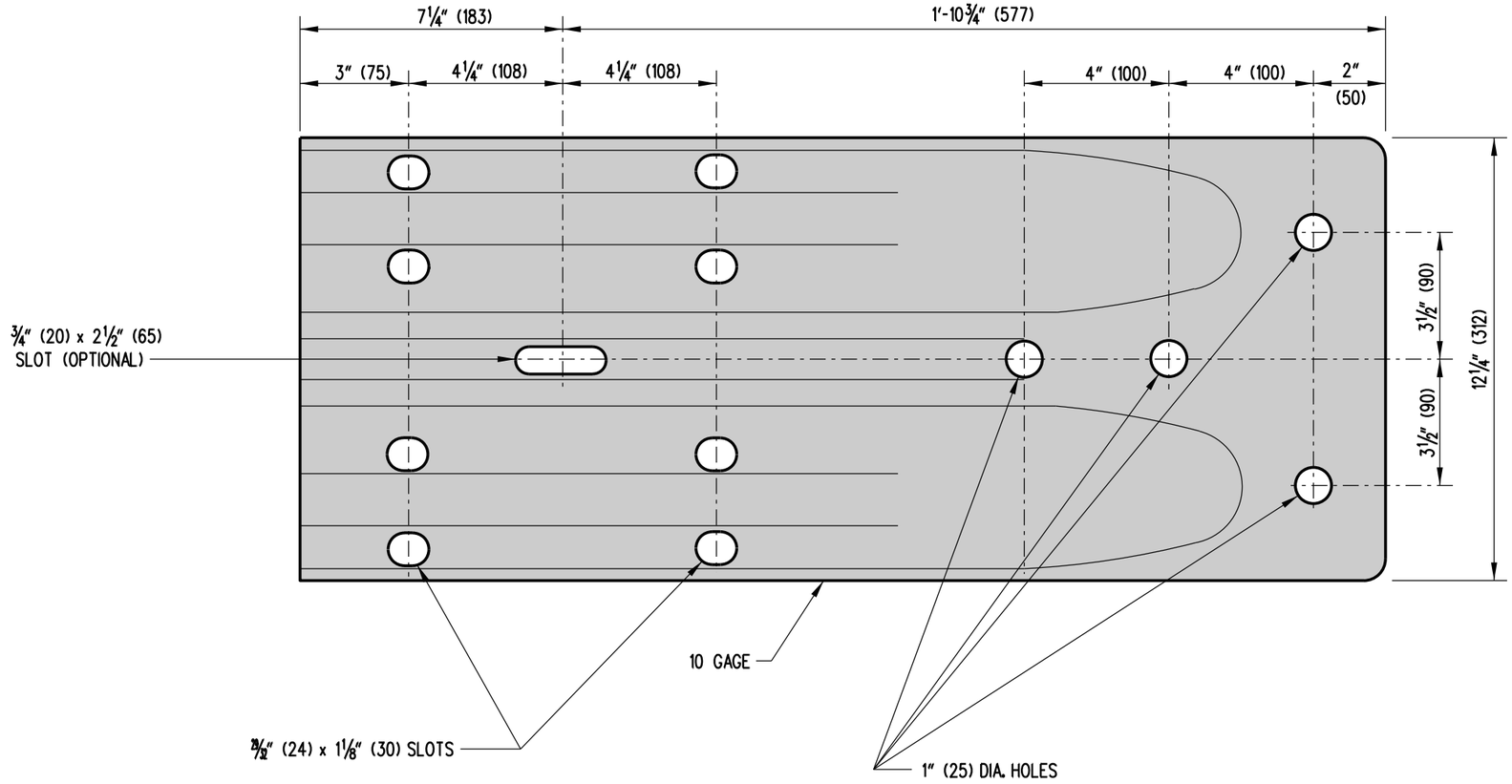
NOTE:

1). ALL HOLES SHALL BE 13/16" (20) DIA. BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
2). WHERE CONDITIONS REQUIRE, ALTERNATE POST LENGTHS IN INCREMENTS OF 6" (150) MAY BE USED.
3). THE RUB RAIL HOLE OFFSET DISTANCE IS 12" (300) FOR GUARDRAIL TO BARRIER CONNECTION, TYPE 1-27 AND 1-31, 1'-2" (360) FOR GUARDRAIL TO BARRIER CONNECTION, TYPE 2-27, AND 1'-6" (460) FOR GUARDRAIL TO BARRIER CONNECTION, TYPE 2-31.

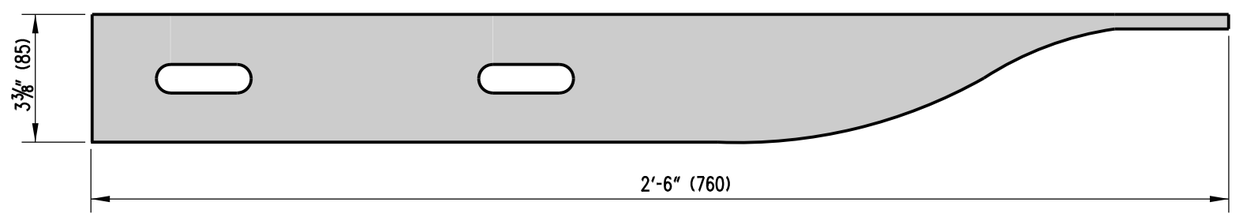
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010) SHT. 2 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

08/25/2010

SCALE : N.T.S.



ELEVATION



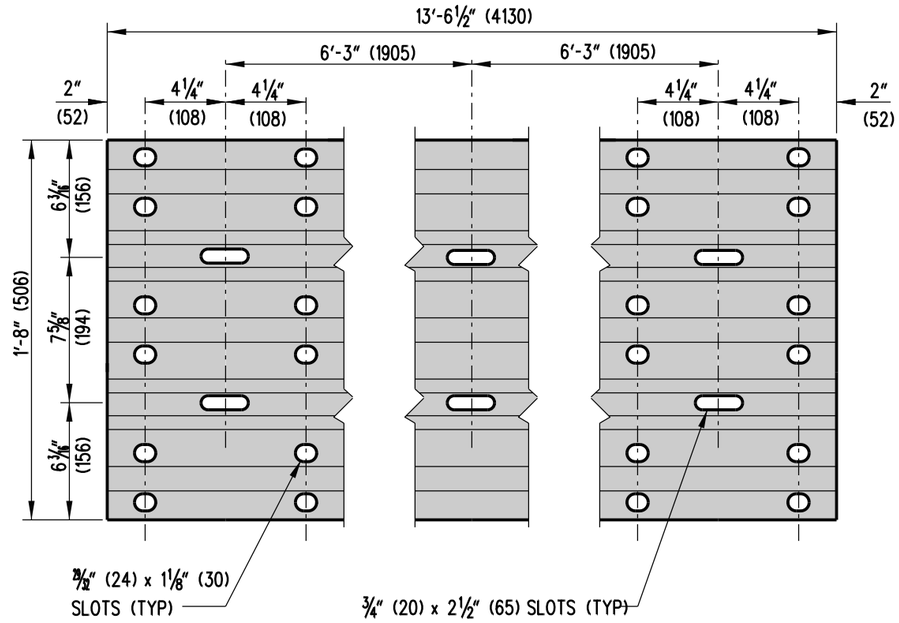
PLAN

W-BEAM TERMINAL CONNECTOR (5)

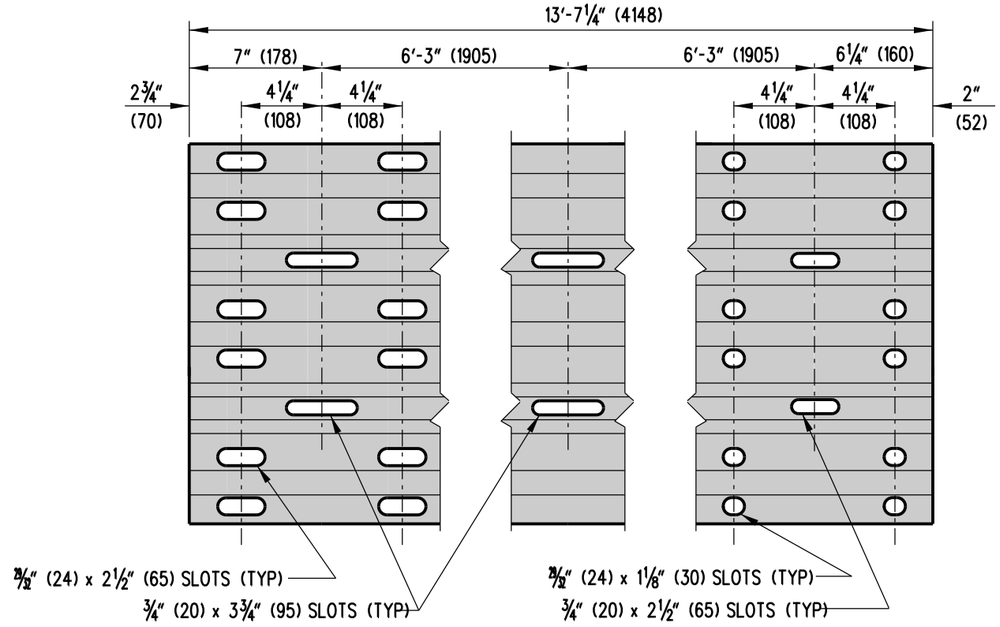
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 3 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

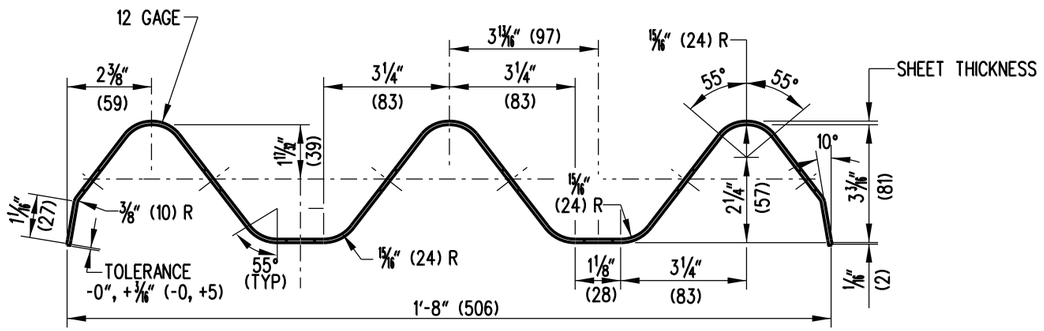
SCALE : N.T.S.



THRIE BEAM ELEVATION



THRIE BEAM EXPANSION ELEMENT

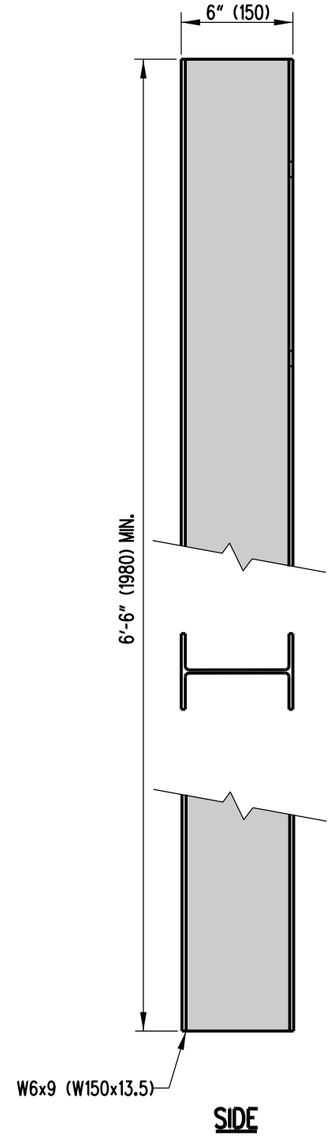


THRIE BEAM SECTION

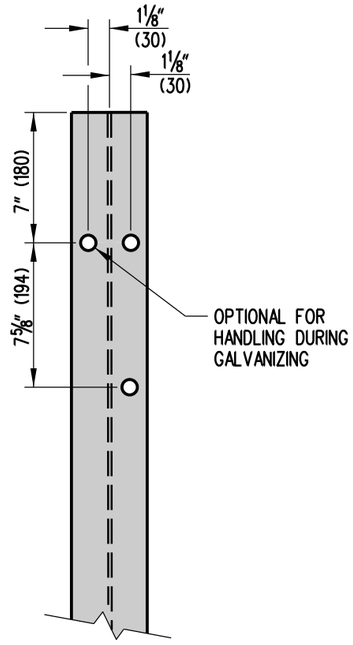
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE			APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER)	12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 4	OF 10	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER)	12/27/2010 (DATE)

09/17/2010

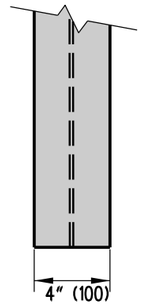
SCALE : N.T.S.



SIDE

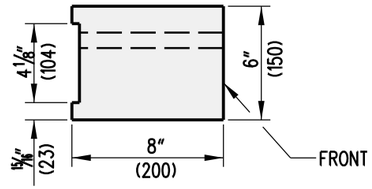


NOTE:
WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

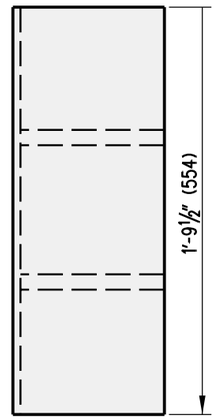


FRONT

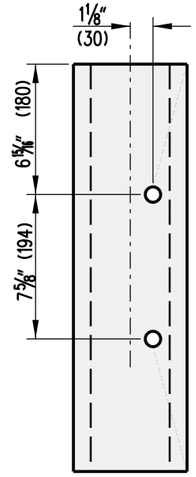
POST (2)



TOP



SIDE



FRONT

OFFSET BLOCK

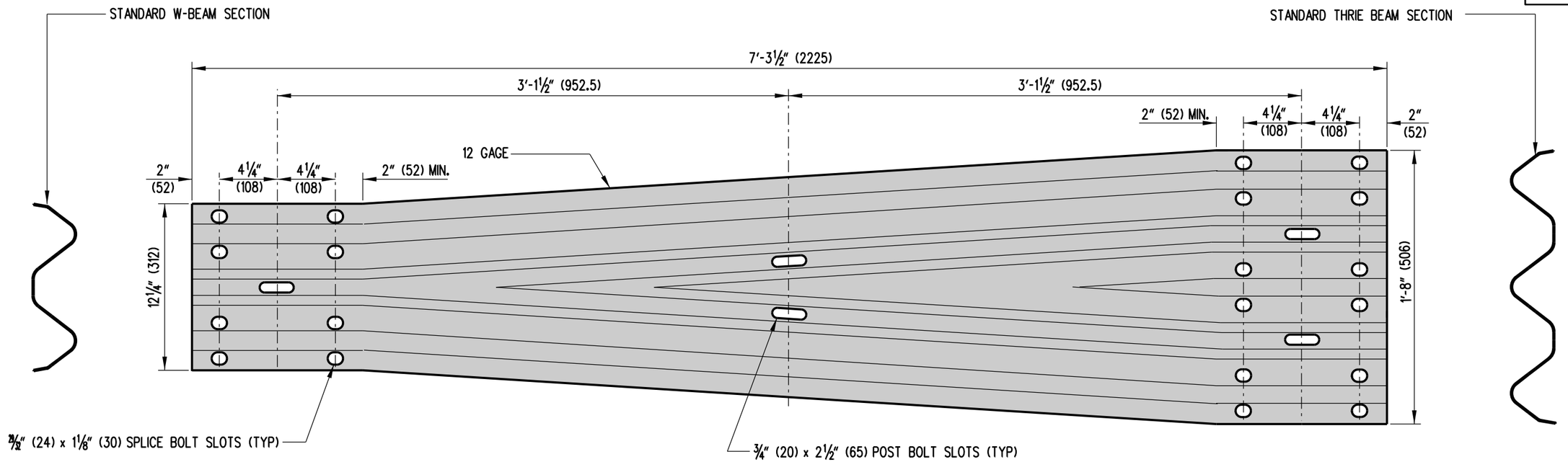
THRIE BEAM STEEL POST AND OFFSET BLOCK

NOTE:
ALL HOLES SHALL BE 1⅜" (20) DIA. BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.

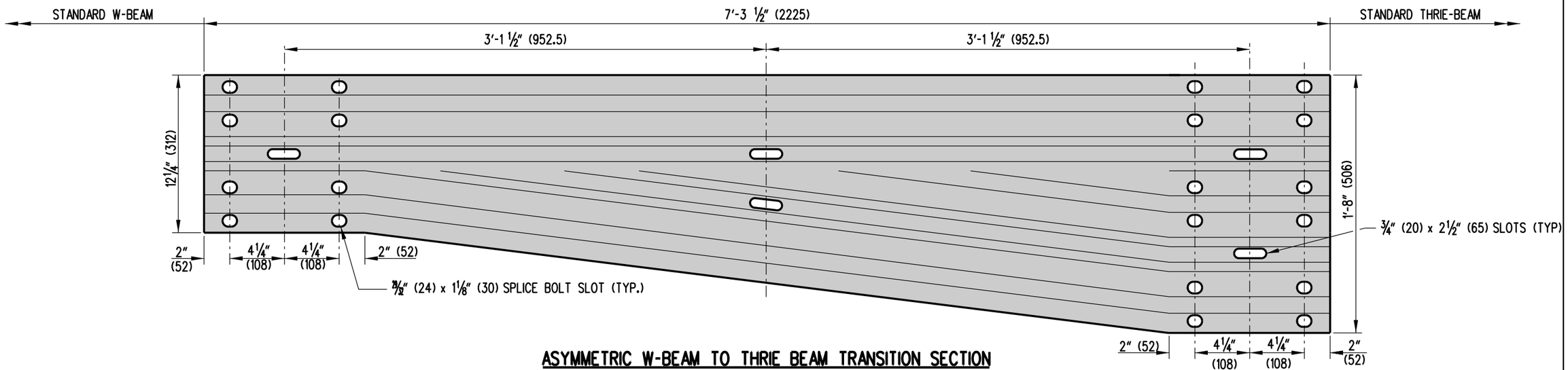
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 5 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

SCALE : N.T.S.



SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION

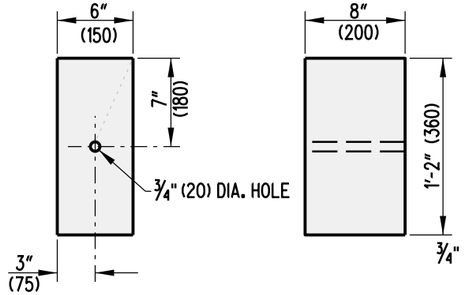


ASYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION

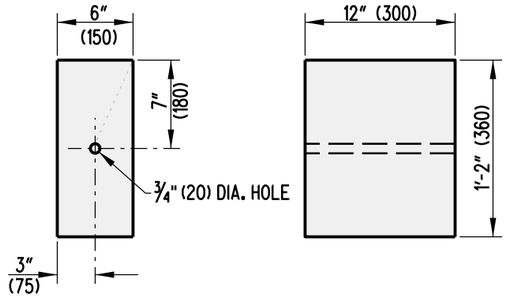
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 6 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

SCALE : N.T.S.

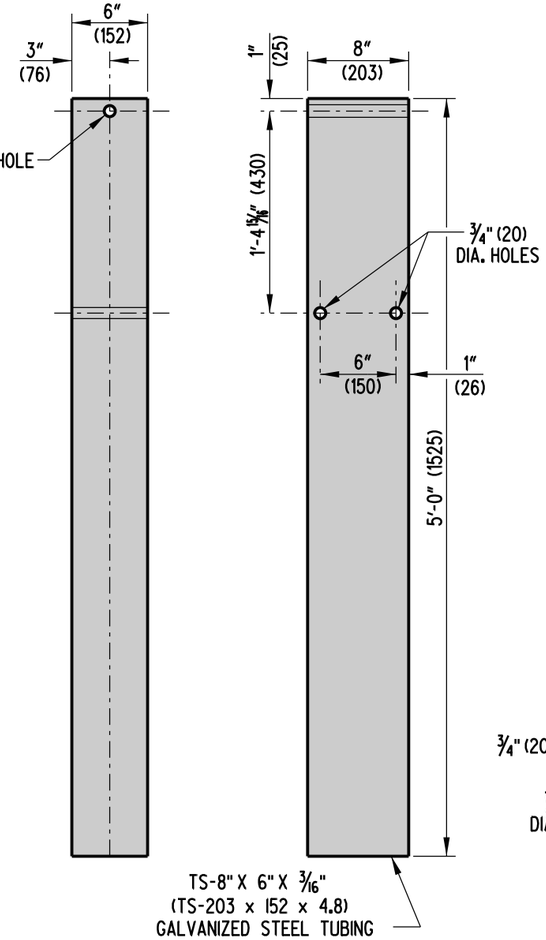


OFFSET BLOCK,
TYPE 27

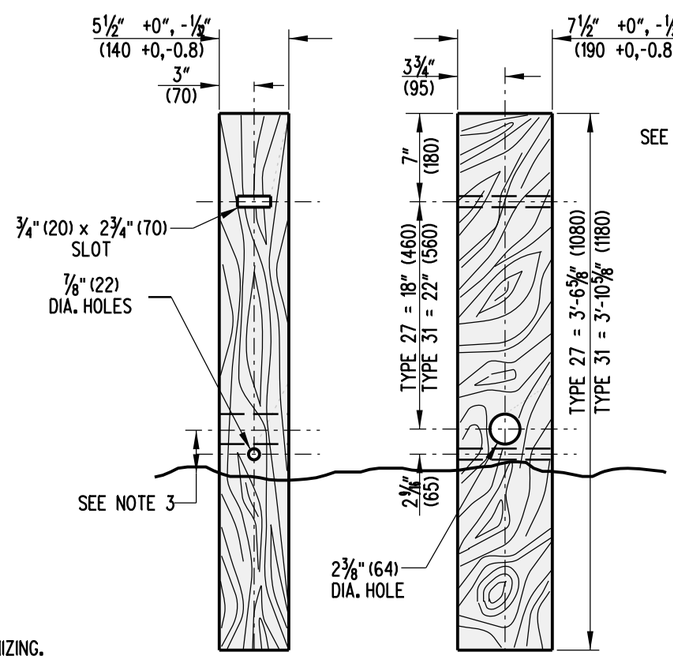


OFFSET BLOCK,
TYPE 31

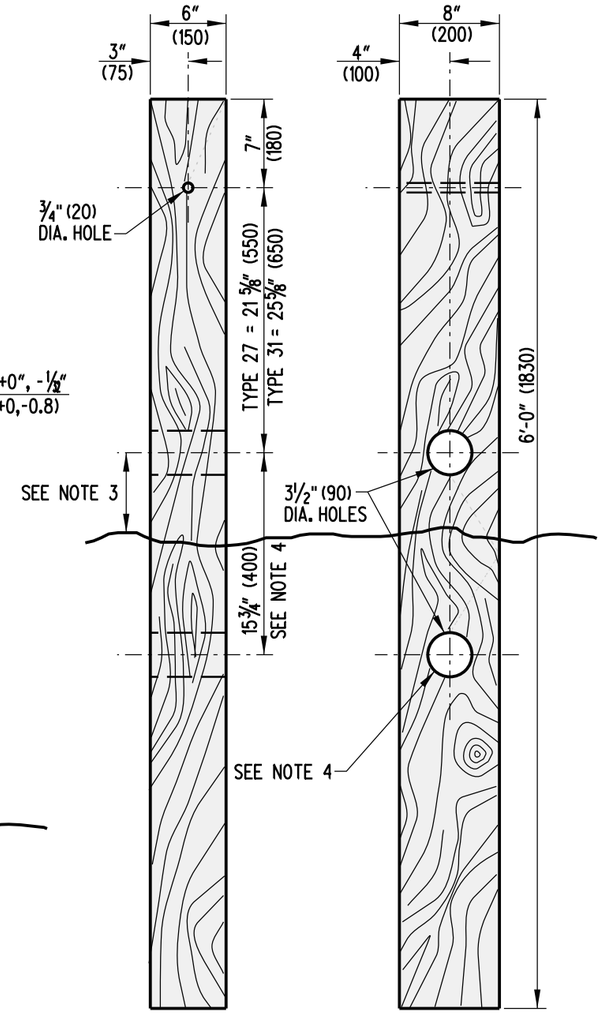
SOIL PLATE



STEEL TUBE



SHORT WOOD BREAKAWAY POST



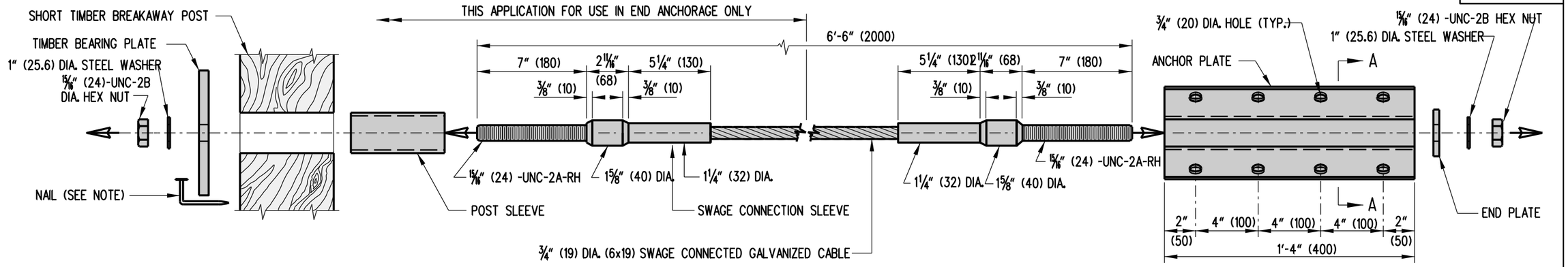
LONG WOOD BREAKAWAY POST

NOTES :
1). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
2). ALL WOOD SIZES ARE NOMINAL DIMENSIONS.
3). POSTS SHOULD BE PLACED SO THAT BREAKAWAY HOLES ARE NO LOWER THAN GROUND LEVEL AND NO HIGHER THAN 4" (100) ABOVE GROUND LEVEL.
4). LOWER BREAKAWAY HOLE ONLY NEEDED ON BURIED END SECTION, TYPE 2.

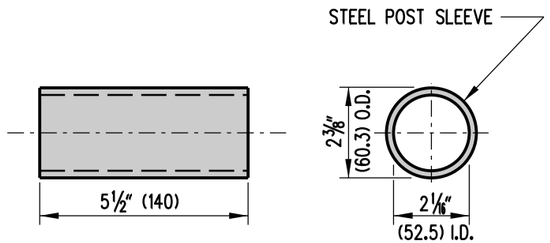
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 7 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

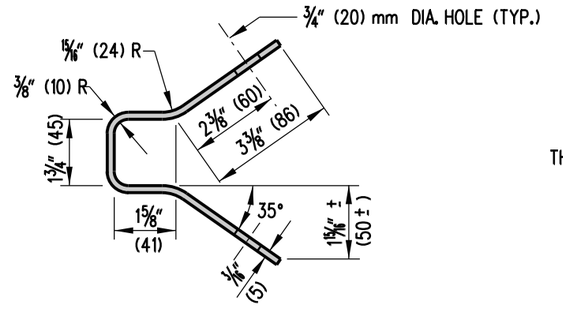
SCALE : N.T.S.



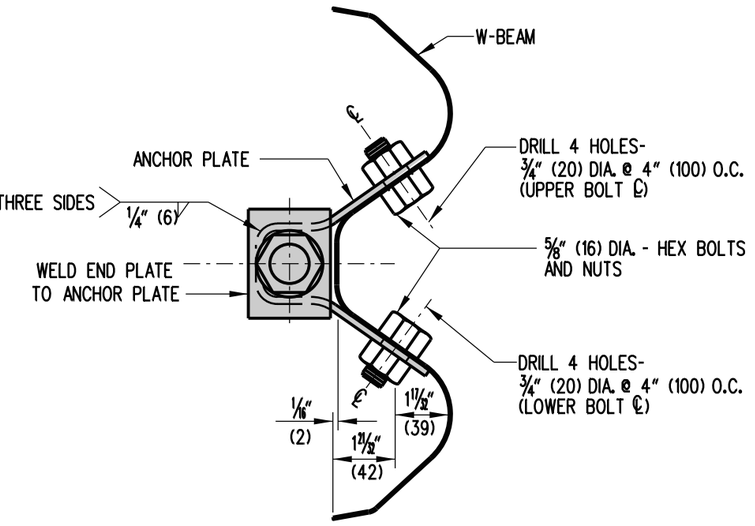
SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY



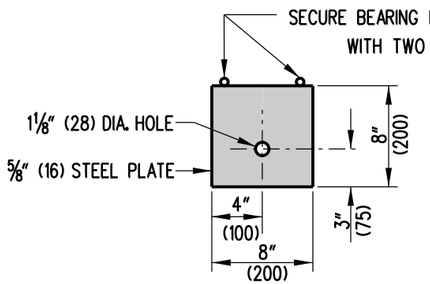
POST SLEEVE



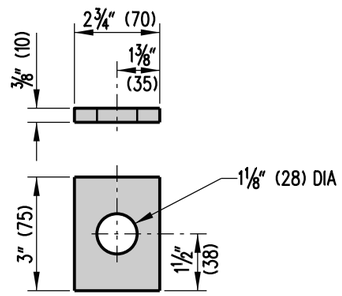
SECTION A-A



ANCHOR PLATE TO W-BEAM CONNECTION DETAIL



TIMBER BEARING PLATE



END PLATE

NOTES: 1). TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, 2 - 10d GALVANIZED STEEL NAILS SHALL BE DRIVEN IN THE SHORT TIMBER BREAKAWAY POST, AND BENT OVER BEARING PLATE.

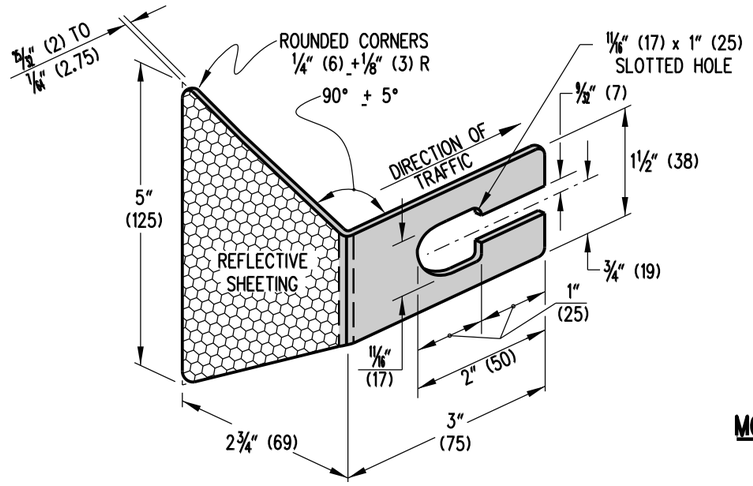
2). TIGHTEN ASSEMBLY UNTIL CABLE IS TAUGHT.

3). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

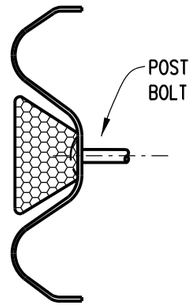
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE CHIEF ENGINEER 12/28/2010 DATE
	STANDARD NO. B-13 (2010)	SHT. 8 OF 10	RECOMMENDED SIGNATURE ON FILE DESIGN ENGINEER 12/27/2010 DATE

09/17/2010

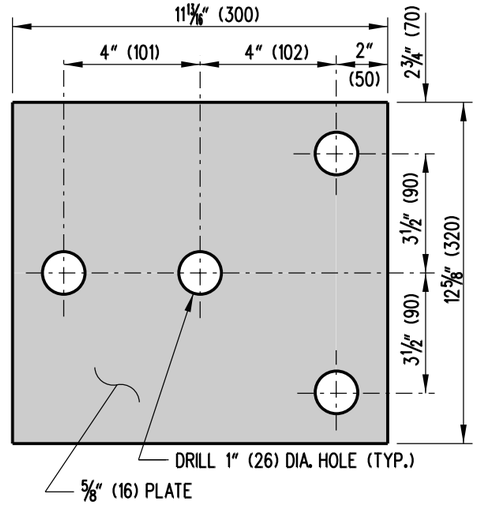
SCALE : N.T.S.



GUARDRAIL DELINEATOR



MOUNTING POSITION

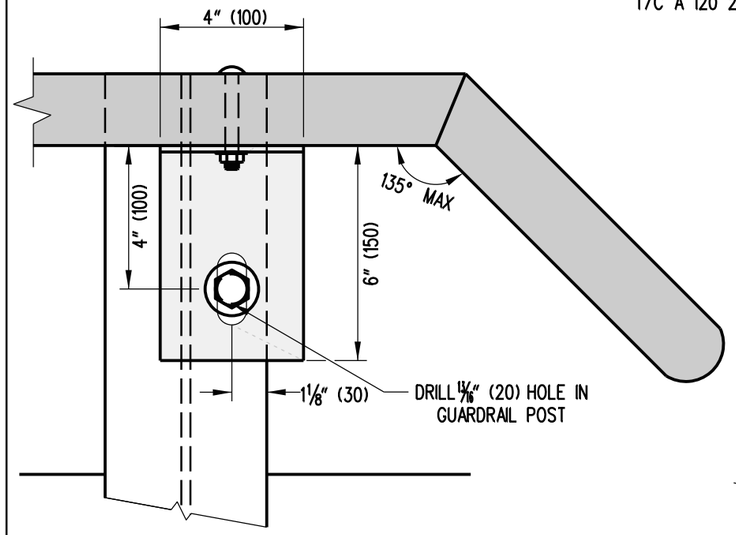


W-BEAM BEARING PLATE DETAIL (11)

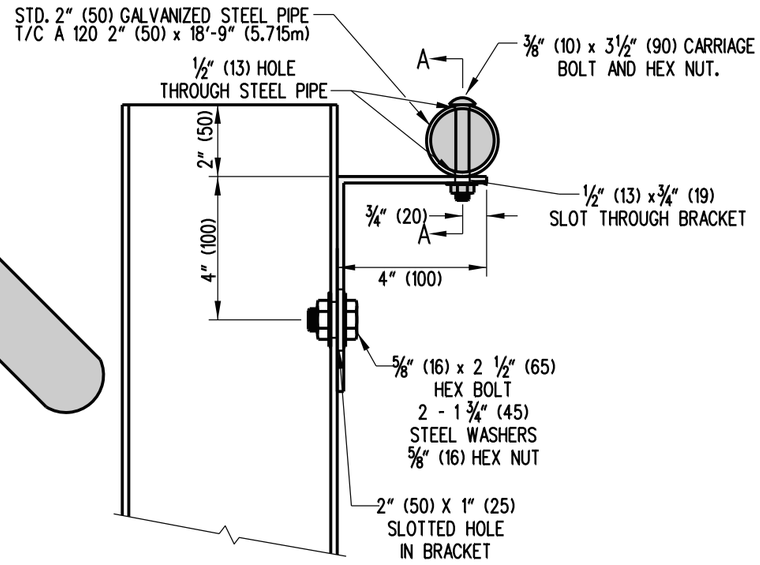
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 9 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/14/2010

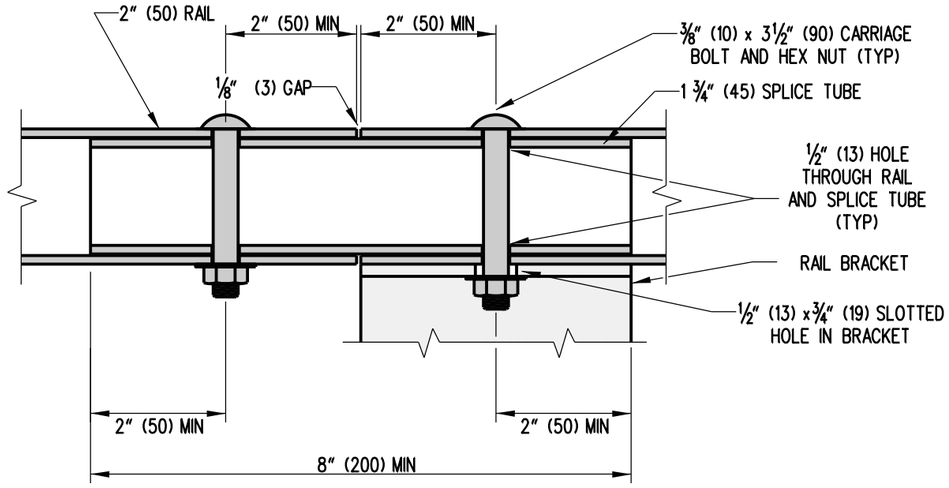
SCALE : N.T.S.



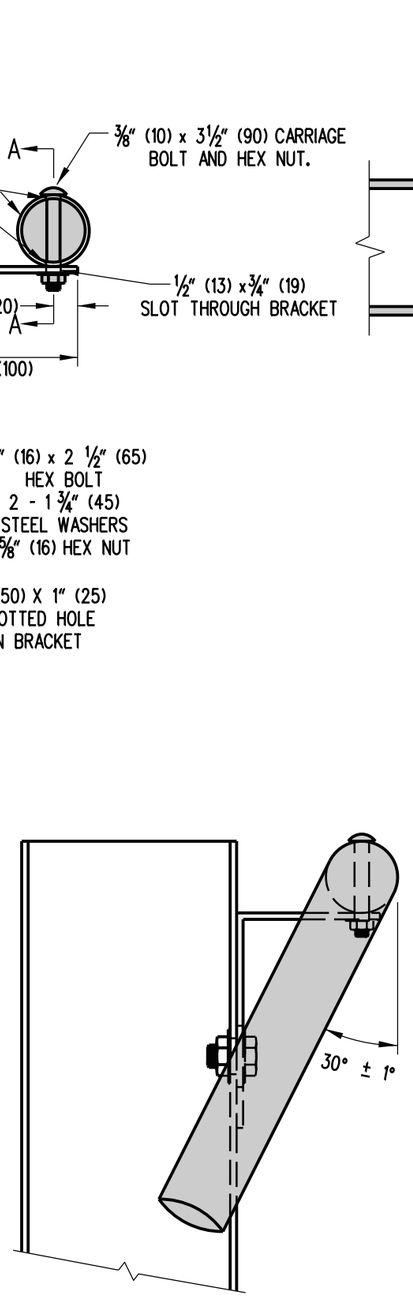
REAR VIEW WITH START & END SECTION



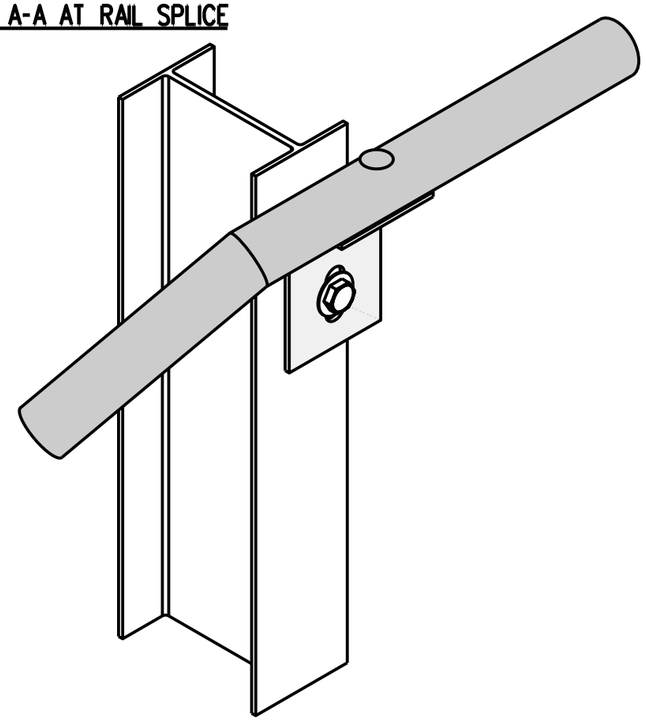
SIDE VIEW



SECTION A-A AT RAIL SPLICE



SIDE VIEW WITH START & END SECTION



ISOMETRIC VIEW WITH START & END SECTION

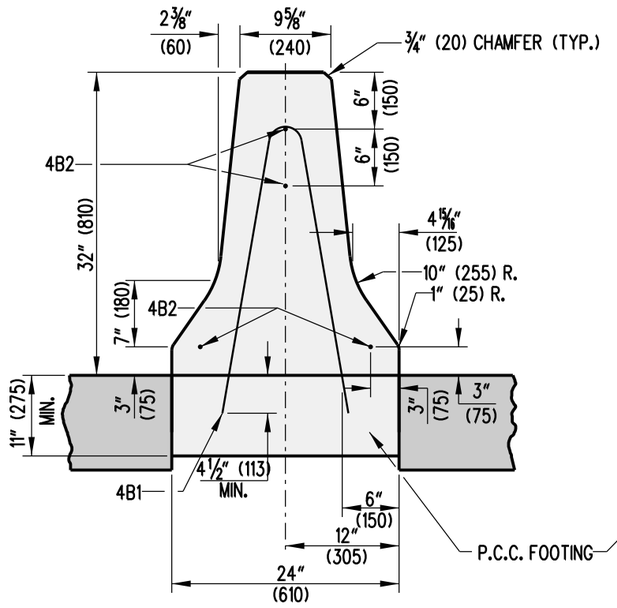
NOTES:

1). RAIL SHALL BE MOUNTED ON GUARDRAIL ADJACENT TO A BIKEWAY OR SIDEWALK.
2). ALL COMPONENTS OF THE RAIL SHALL BE SHOP FABRICATED. ALL CUTTING AND DRILLING SHALL BE DONE IN THE SHOP.
3). ALL EXPOSED THREADED HARDWARE SHALL BE BURRED.
4). GUARDRAIL POSTS UPON WHICH RAIL IS TO BE INSTALLED SHALL BE SHOP DRILLED FOR THE RAIL BRACKETS DURING FABRICATION.
5). ALL RAIL SPLICES WILL BE AT RAIL SUPPORT BRACKETS, THE SAME BOLT USED TO ATTACH THE RAIL TO THE BRACKET WILL BE USED TO SECURE THE SPLICE TUBE.
6). RAILS SHALL BE INSTALLED ONLY ON STANDARD W-BEAM SECTIONS AND AT LEAST ONE POST AWAY FROM THE PAYMENT LIMITS OF THE END TREATMENT.

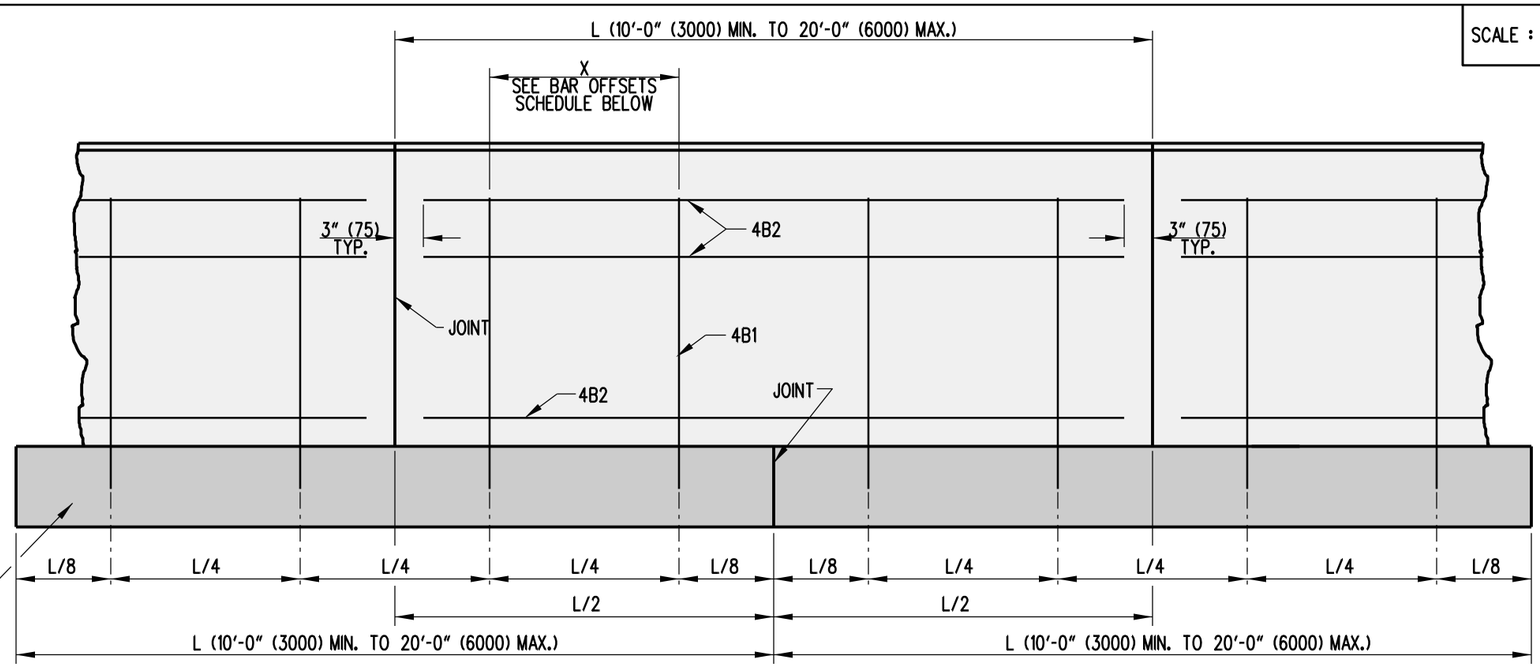
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL MOUNTED RAIL	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010) SHT. 10 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

08/25/2010

SCALE : N.T.S.

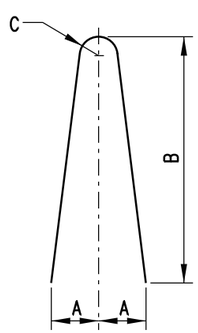


SECTION



ELEVATION

TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION



TYPE '1' BAR

BAR OFFSETS		
NOMINAL LENGTH OF BARRIER SECTION (L)	X	NO. REQ'D FOR EACH BARRIER SECTION
20' (6000)	5' - 0" (1500)	4
18' (5500)	4' - 6" (1350)	4
16' (5000)	4' - 0" (1200)	4
14' (4500)	3' - 6" (1050)	4
12' (4000)	3' - 0" (900)	4
10' (3000)	2' - 6" (750)	4

BAR LIST							
MARK	SIZE	NUMBER IN EACH SECTION	LENGTH	TYPE	A	B	C
4B1	4 (13)	**	5'-4" (1625)	1	7" (175)	30½" (775)	2" (50)
4B2	4 (13)	4	*	STR.	N/A	N/A	N/A

* THE LENGTH OF BAR 4B2 SHALL BE 6" (150) SHORTER IN LENGTH THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.

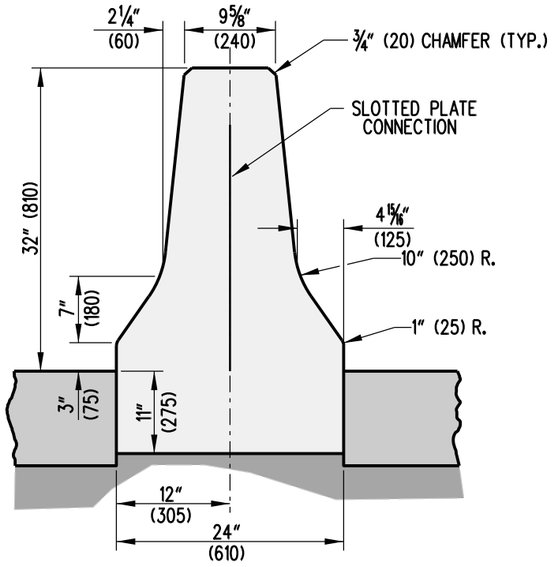
** SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

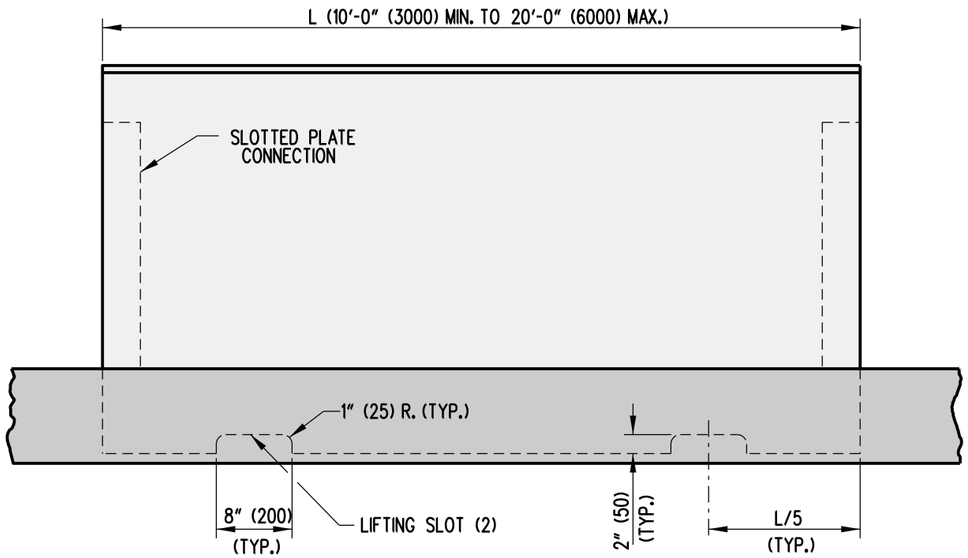
NOTES: 1). CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1½" (40) MIN.
2). BARS SHALL BE CUT AT EVERY JOINT IF MADE USING CONTINUOUS SLIP-FORM CONSTRUCTION.

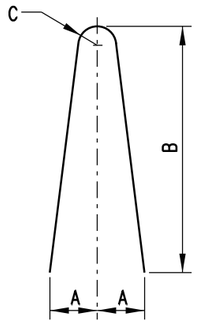
DELAWARE DEPARTMENT OF TRANSPORTATION	32" (960) CONCRETE SAFETY BARRIER (F SHAPE)	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-14 (2009) SHT. 1 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/21/2009

SCALE : N.T.S.

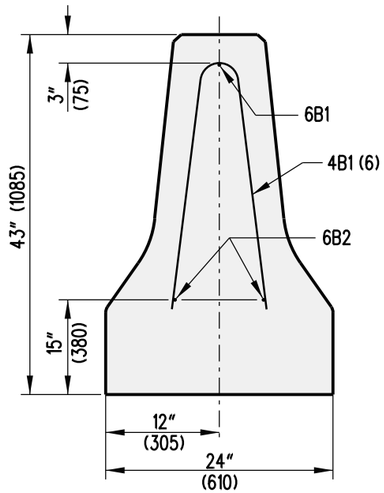




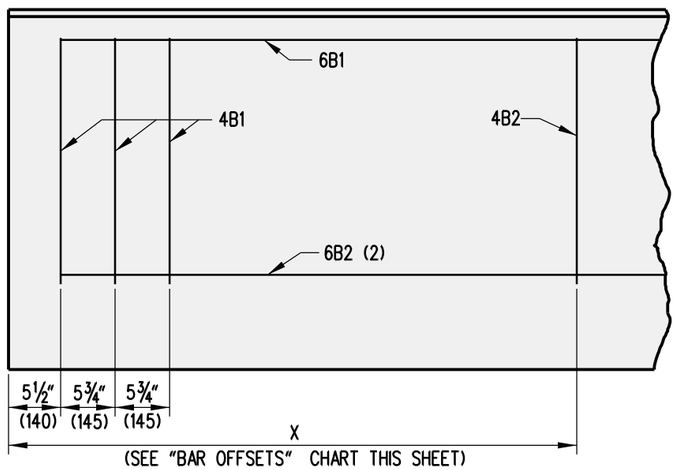


TYPE '1' BAR

TYPICAL PRE-CAST CONSTRUCTON



'F' SHAPE BARRIER SECTION



ELEVATION

BAR OFFSETS		
NOMINAL LENGTH OF BARRIER UNIT	"X"	NO. REQ'D FOR EACH BARRIER UNIT
20' (6000)	6' - 11" (2100)	2
18' (5500)	6' - 5" (1950)	2
16' (5000)	5' - 11" (1800)	2
14' (4500)	7' - 0" (2250)	1
12' (4000)	6' - 0" (2000)	1
10' (3000)	5' - 0" (1500)	1

BAR LIST							
MARK	SIZE	NUMBER IN EACH SECTION	LENGTH	TYPE	A	B	C
4B1	4 (13)	6	4'-7" (1400)	1	5" (125)	26" (660)	2" (50)
4B2	4 (13)	**	4'-7" (1400)	1	5" (125)	26" (660)	2" (50)
6B1	6 (19)	1	*	STR.			
6B2	6 (19)	2	*	STR.			

* THE LENGTH OF BARS 6B1 AND 6B2 SHALL BE 11" (280) SHORTER IN LENGTH THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.

** SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

TYPICAL PRE-CAST REINFORCEMENT DETAILS

NOTES: 1). CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1½" (40) MIN..

DELAWARE
DEPARTMENT OF TRANSPORTATION

32" (960) CONCRETE SAFETY BARRIER (F SHAPE)

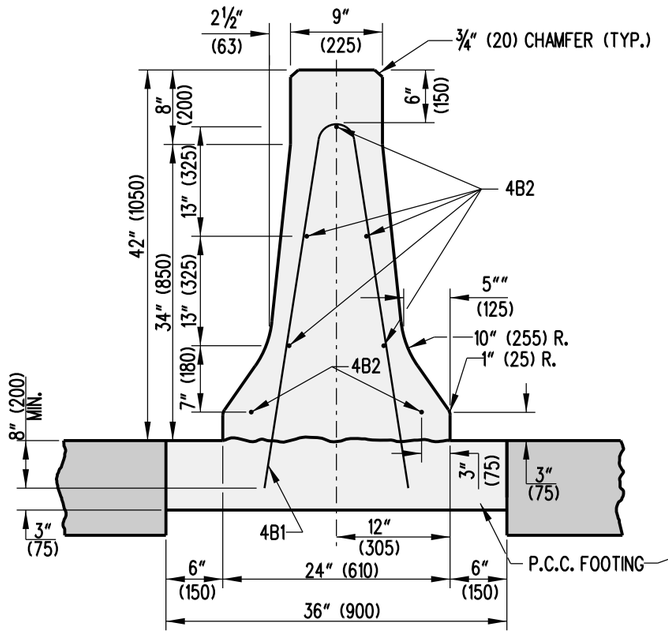
STANDARD NO. B-14 (2009) | SHT. 2 OF 4

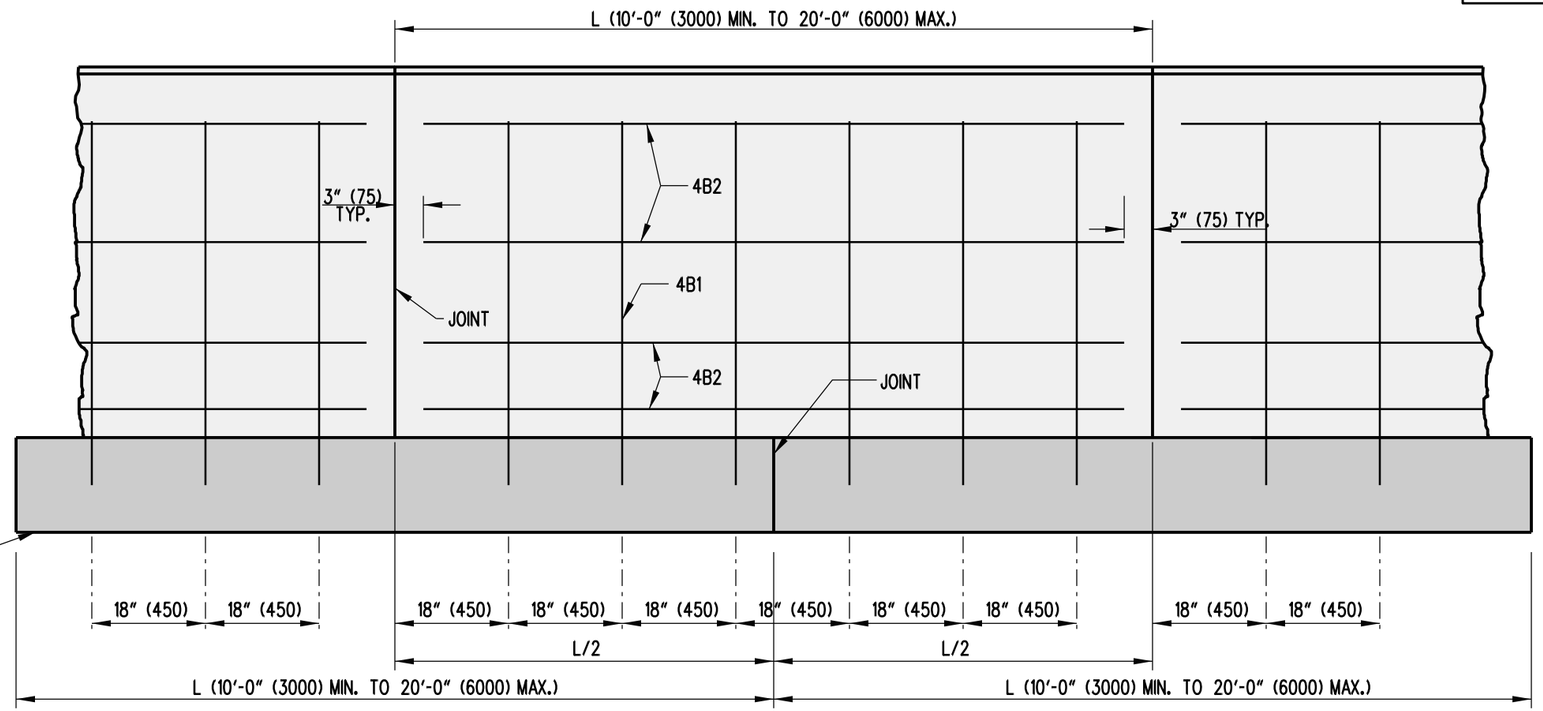
APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/18/2009

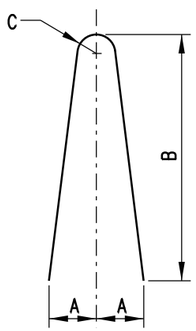
SCALE : N.T.S.





SECTION

ELEVATION



TYPE '1' BAR

BAR OFFSETS	
NOMINAL LENGTH OF BARRIER SECTION (L)	NO. REQ'D FOR EACH BARRIER SECTION
20' (6000)	13
18' (5500)	12
16' (5000)	10
14' (4500)	9
12' (4000)	8
10' (3000)	6

BAR LIST							
MARK	SIZE	NUMBER IN EACH SECTION	LENGTH	TYPE	A	B	C
4B1	4 (13)	* *	7'-6" (2286)	1	6" (150)	44" (1118)	2" (50)
4B2	4 (13)	7	*	STR.	N/A	N/A	N/A

* THE LENGTH OF BAR 4B2 SHALL BE 6" (150) SHORTER IN LENGTH THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.

* * SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

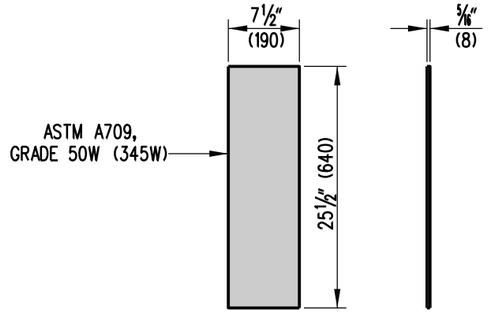
TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

NOTES: 1). CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1½" (40) MIN.
2). BARS SHALL BE CUT AT EVERY JOINT IF MADE USING CONTINUOUS SLIP-FORM CONSTRUCTION.

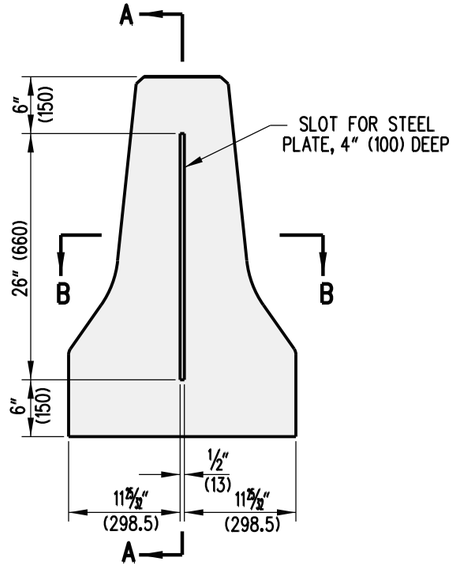
DELAWARE DEPARTMENT OF TRANSPORTATION	42" (1050) CONCRETE BARRIER DETAILS (F-SHAPE)	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-14 (2009) SHT. 3 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/21/2009

SCALE : N.T.S.

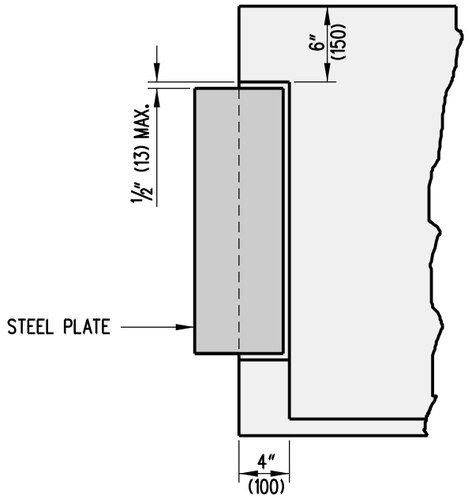


STEEL CONNECTOR PLATE

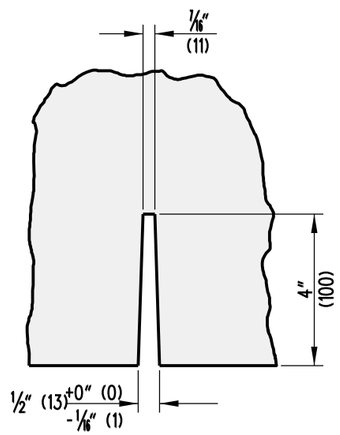


SLOT DIMENSIONS

CONCRETE SAFETY BARRIER, PRECAST CONSTRUCTION
'F' SHAPE BARRIER SECTION



SECTION A-A

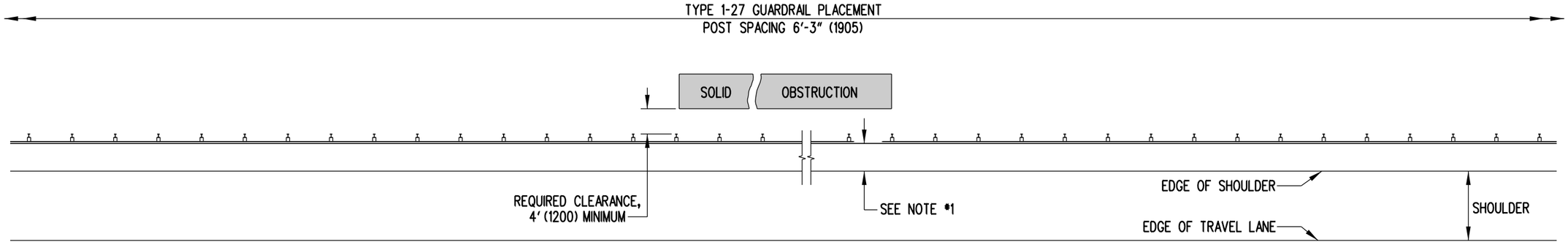


SECTION B-B

DELAWARE DEPARTMENT OF TRANSPORTATION	SLOTTED PLATE CONNECTION DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-14 (2009)	SHT. 4 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

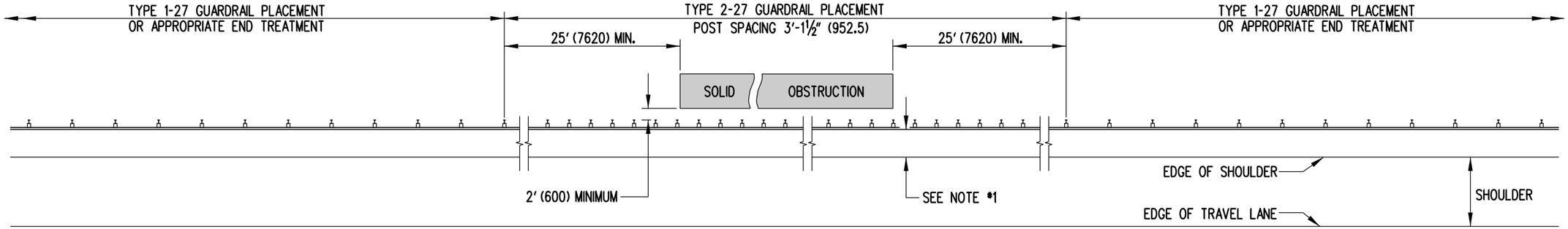
09/18/2009

SCALE : N.T.S.



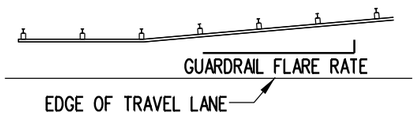
TYPE 1-27 GUARDRAIL

TYPICAL GUARDRAIL TREATMENT
WHEN THE REQUIRED 4' (1200) CLEARANCE TO OBSTRUCTION IS AVAILABLE

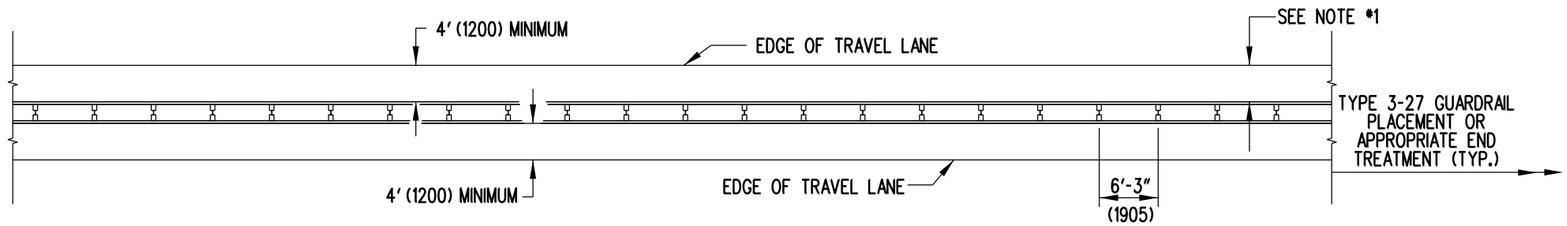


TYPE 2-27 GUARDRAIL

TYPICAL GUARDRAIL TREATMENT
WHEN 2' (600) TO 4' (1200) OF CLEARANCE TO OBSTRUCTION IS AVAILABLE



FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1



TYPE 3-27 GUARDRAIL

TYPICAL MEDIAN GUARDRAIL TREATMENT

NOTES:
1). THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL SHOULD BE MAXIMIZED. THIS AREA SHALL BE GRADED 10:1 OR FLATTER.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFICIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL APPLICATIONS

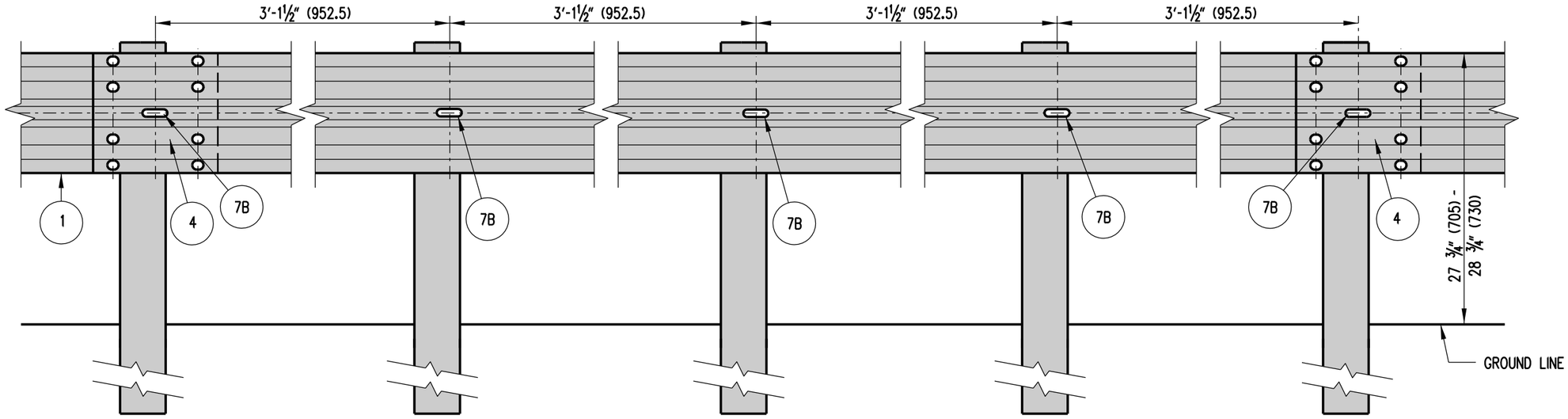
STANDARD NO. B-15 (2010) | **SHT. 1 OF 3**

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

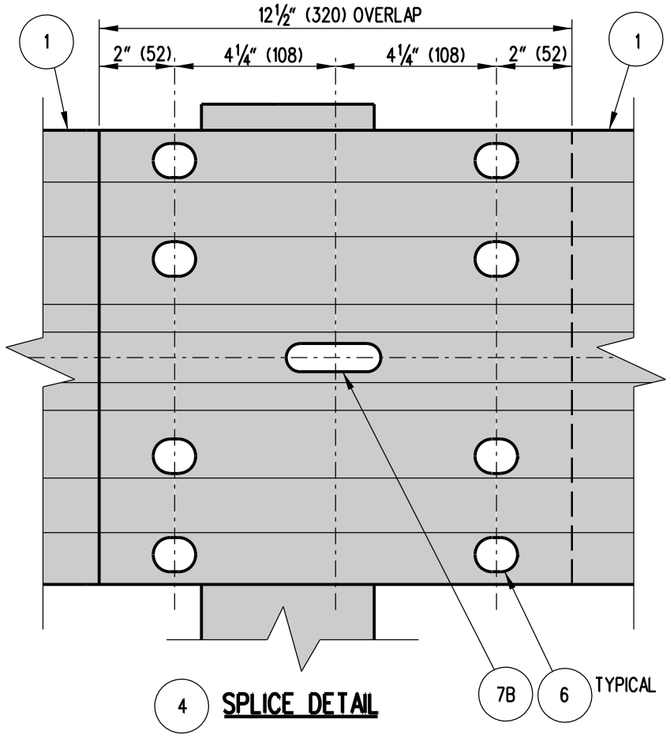
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/03/2010

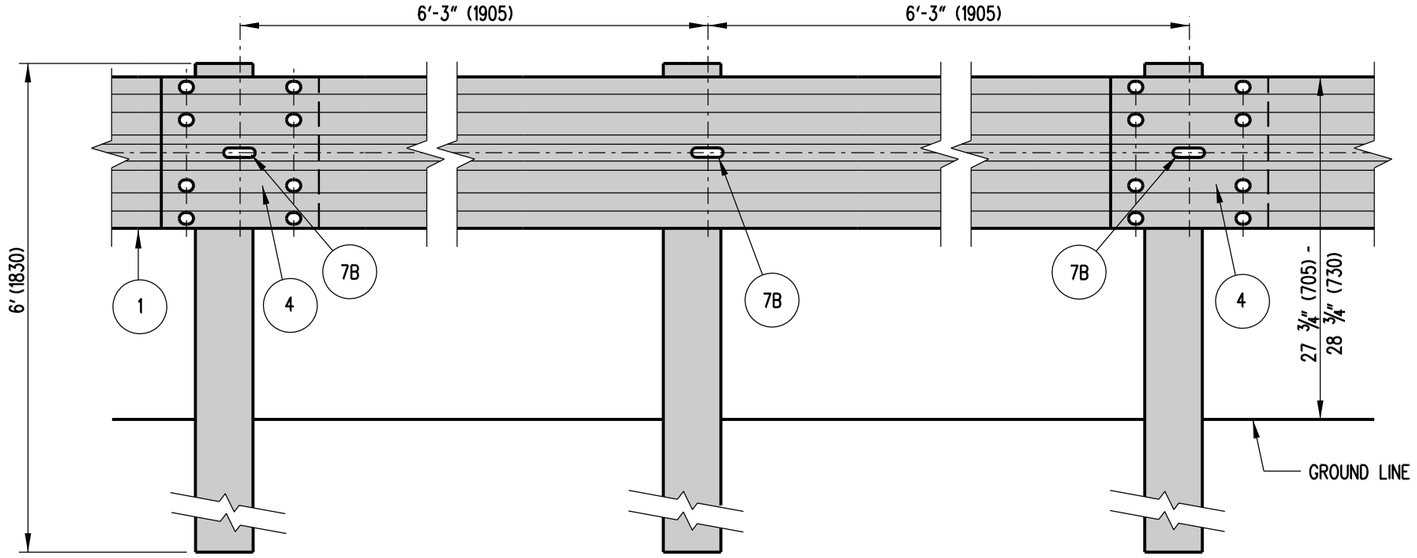
SCALE : N.T.S.



TYPE 2-27



4 SPLICE DETAIL



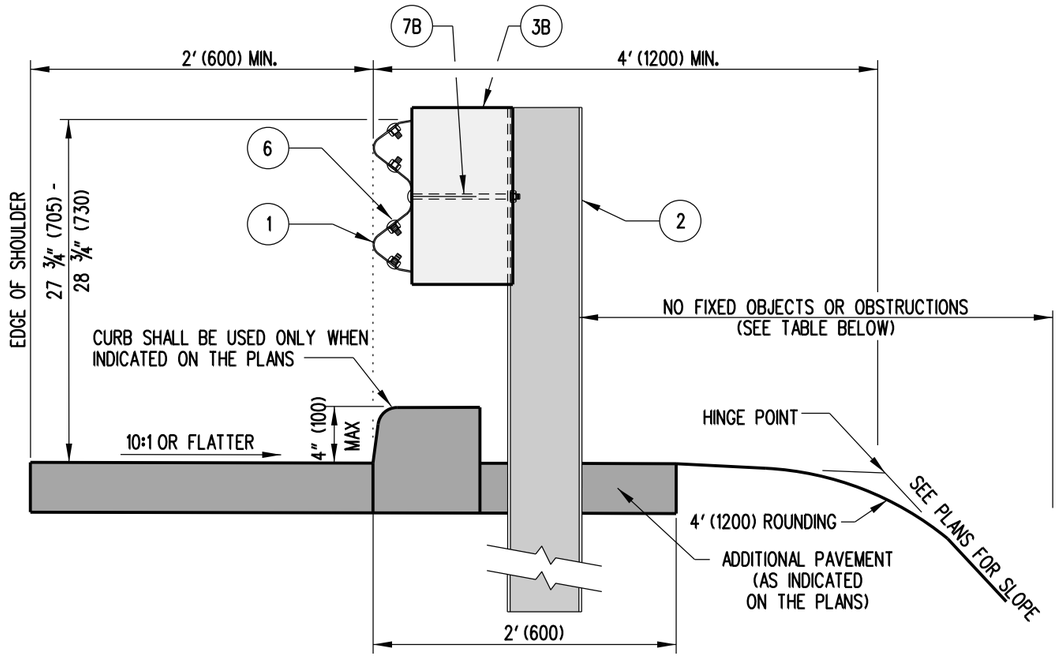
TYPE 1-27 OR 3-27

NOTE : OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.

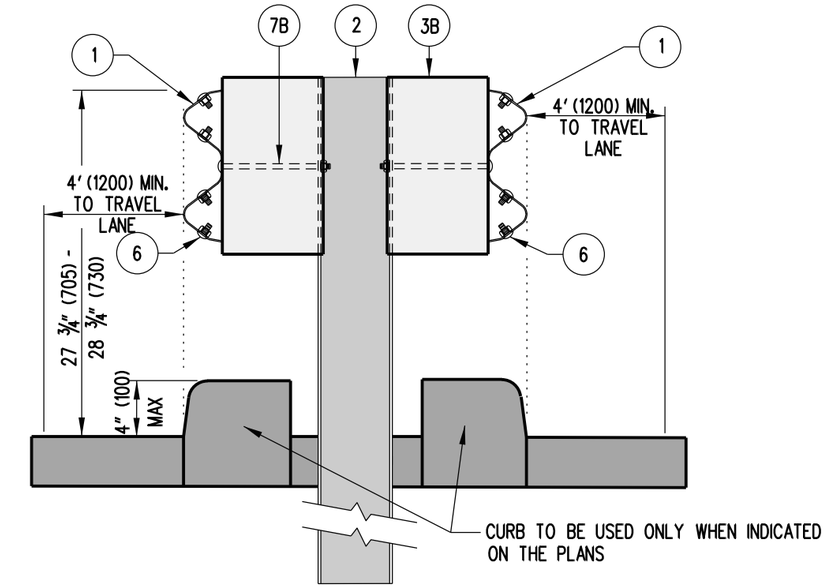
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL APPLICATIONS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-15 (2010)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/20/2010

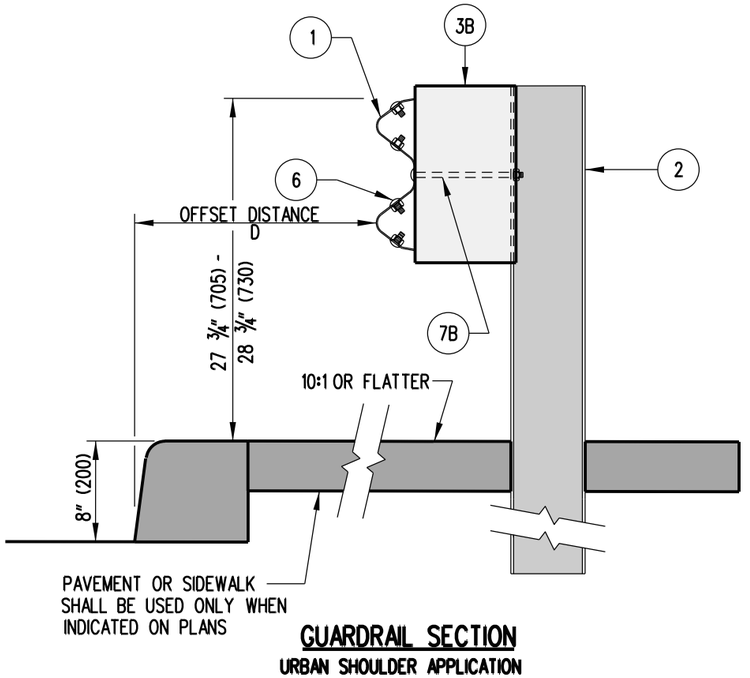
SCALE : N.T.S.



GUARDRAIL SECTION
RURAL SHOULDER APPLICATION



GUARDRAIL SECTION
MEDIAN APPLICATION



GUARDRAIL SECTION
URBAN SHOULDER APPLICATION

TYPE	POST SPACING	CLEAR AREA BEHIND POST
1	6'-3" (1905)	4'-0" (1.2m) MIN
2	3' 1-1/2" (952.5)	2'-0" (600) MIN

DESIGN SPEED	D
< 50 MPH (80 km/h)	6'-0" (1800)
≥ 50 MPH (80 km/h)	10'-0" (3000)

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL APPLICATIONS

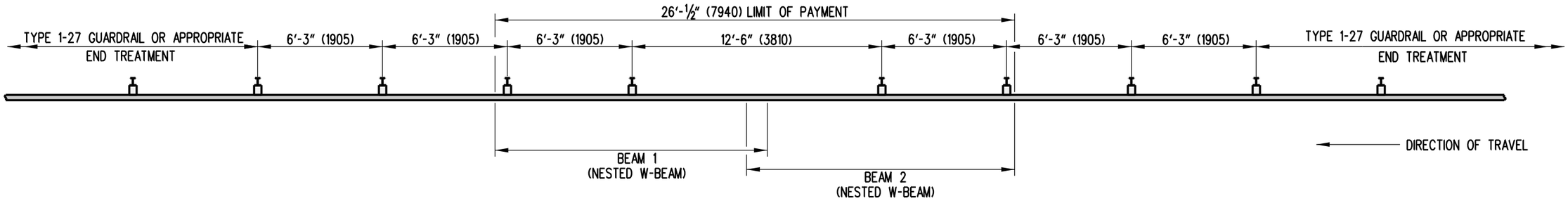
STANDARD NO. B-15 (2010) SHT. 3 OF 3

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

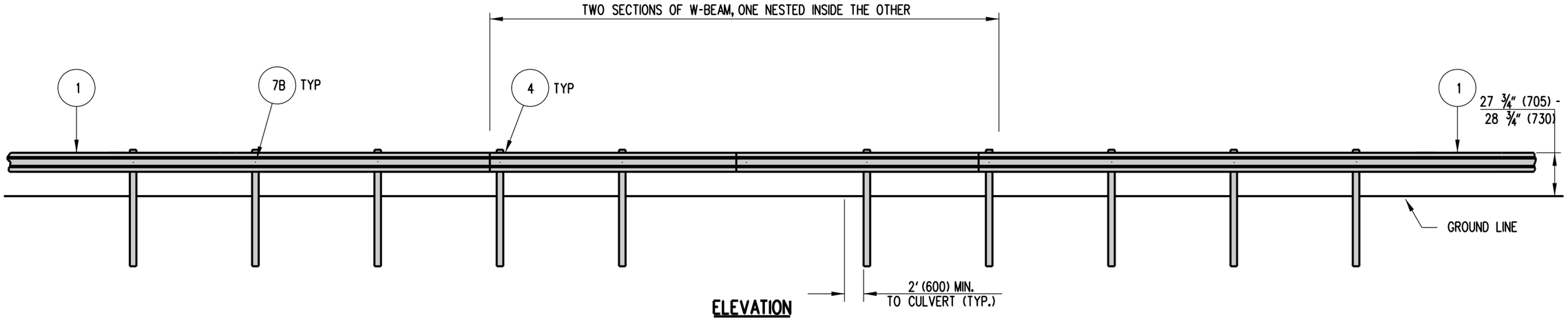
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/20/2010

SCALE : N.T.S.



PLAN



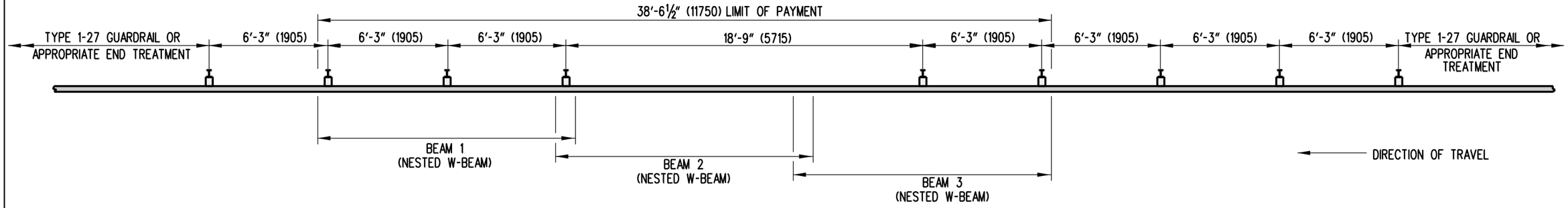
ELEVATION

NOTES:
1). ALL W-BEAMS ARE 13′-6½″ (4130) IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

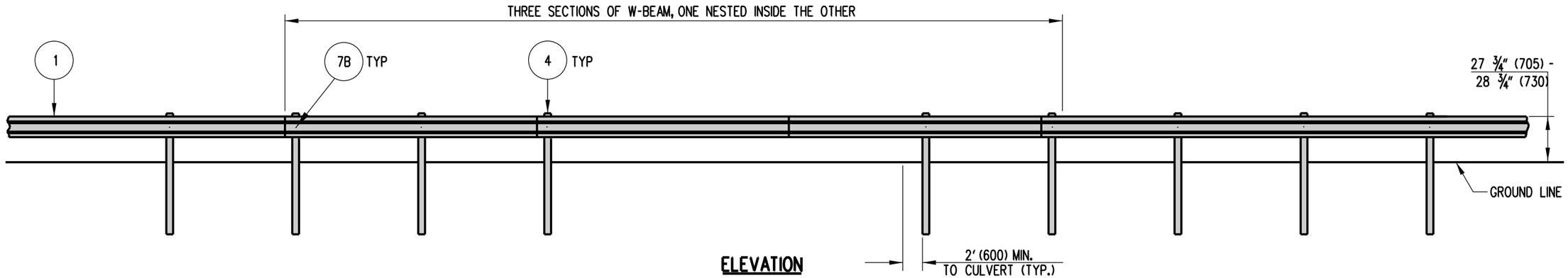
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 1-27	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-16 (2010) — SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/20/2010

SCALE : N.T.S.



PLAN



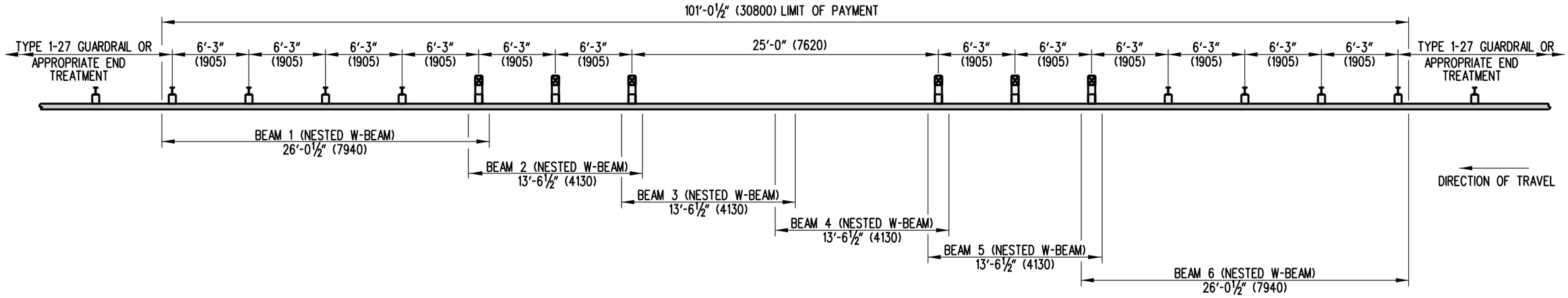
ELEVATION

NOTES:
1). ALL W-BEAMS ARE 13'-6½" (4130) IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

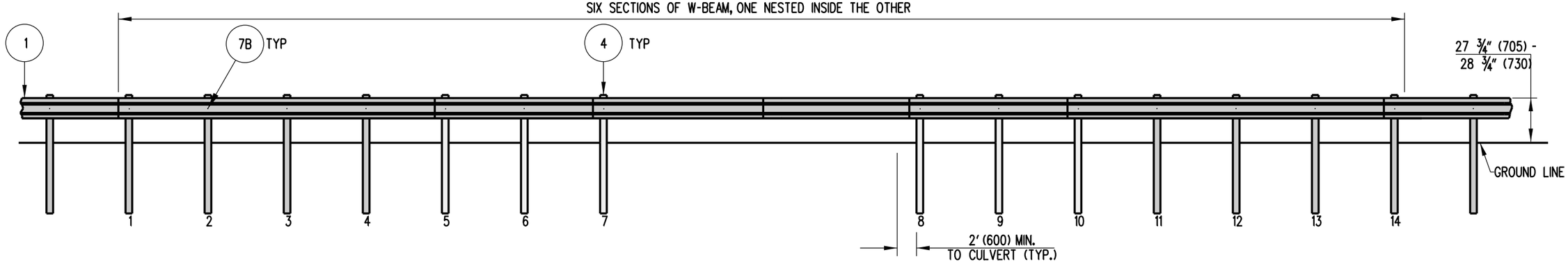
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 2-27	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-16 (2010) SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

SCALE : N.T.S.



PLAN



ELEVATION

NOTES:

1). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

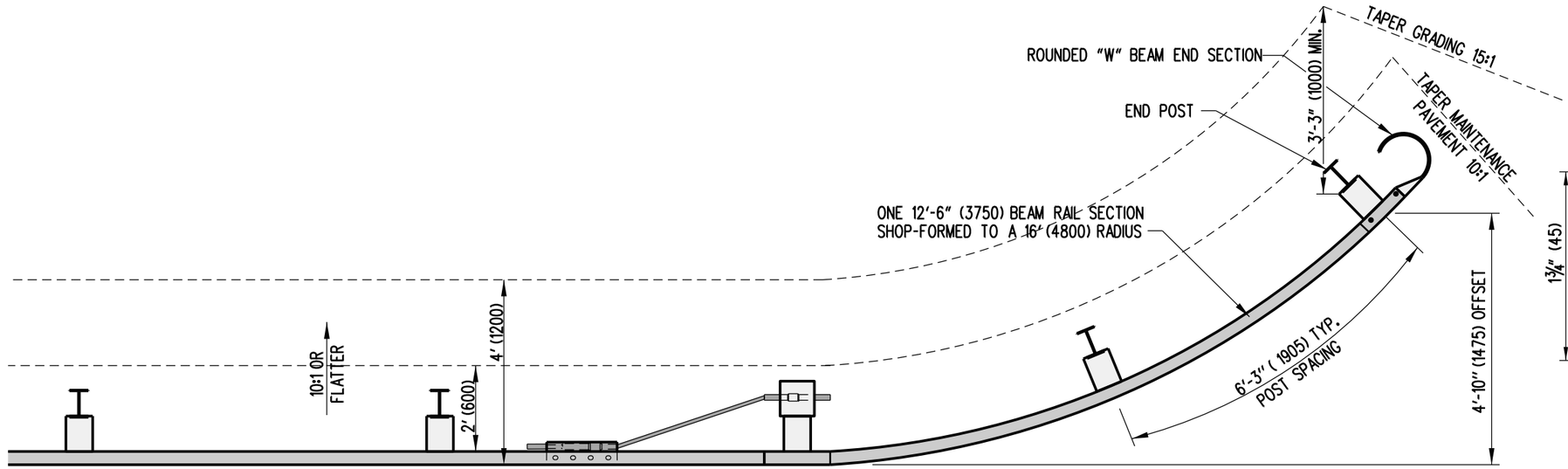
2). POSTS 1-4 AND 11-14 ARE TO BE W6X9 (W15-X13.5) STEEL POSTS. POSTS 5-10 ARE TO BE 6"x8"x6' (150x200x1830) BREAKAWAY WOOD POSTS WITH 2 WOOD BLOCKS AT EACH OF THESE 6 POSTS.

3). THE SPLICES AT POSTS 5, 7, 8, & 10 ARE TO USE ⅝" (16) GUARDRAIL BOLT (L=26" (660)).

DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERT, TYPE 3-27	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-16 (2010) SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/14/2010

SCALE : N.T.S.



PLAN

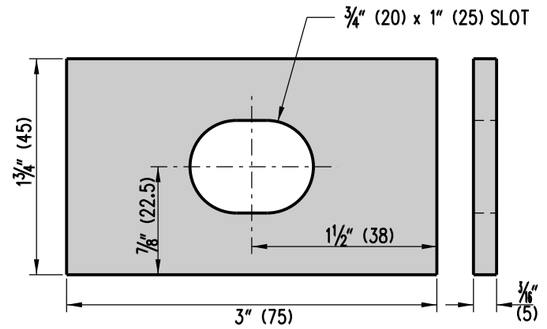
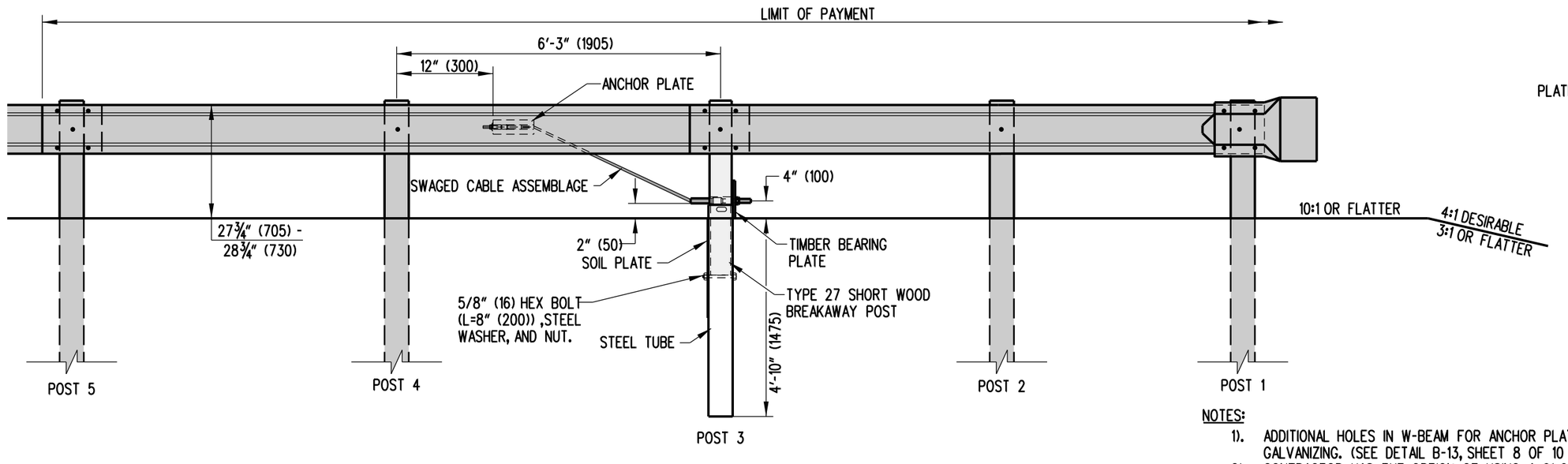


PLATE WASHER DETAIL



ELEVATION

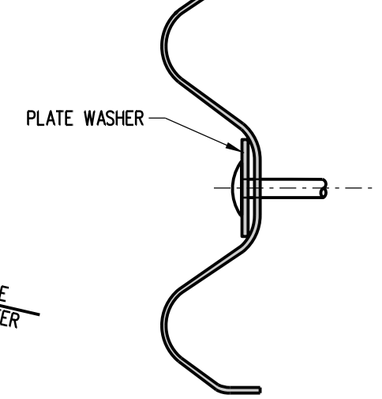


PLATE WASHER MOUNTING POSITION

NOTES:

1). ADDITIONAL HOLES IN W-BEAM FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING. (SEE DETAIL B-13, SHEET 8 OF 10 FOR HOLE SPACING INFORMATION).
2). CONTRACTOR HAS THE OPTION OF USING A 6'-0" (1830) STEEL TUBE WITHOUT A SOIL PLATE OR A 5'-0" (1525) STEEL TUBE WITH A SOIL PLATE.
3). PLATE WASHERS SHALL BE INSTALLED AT POSTS 3 & 4 ONLY.
4). THIS END TREATMENT SHALL ONLY BE USED ON TRAVEL WAYS WITH A POSTED SPEED LIMIT OF 40 MPH (64 KM/H) OR LESS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT, TYPE 4-27

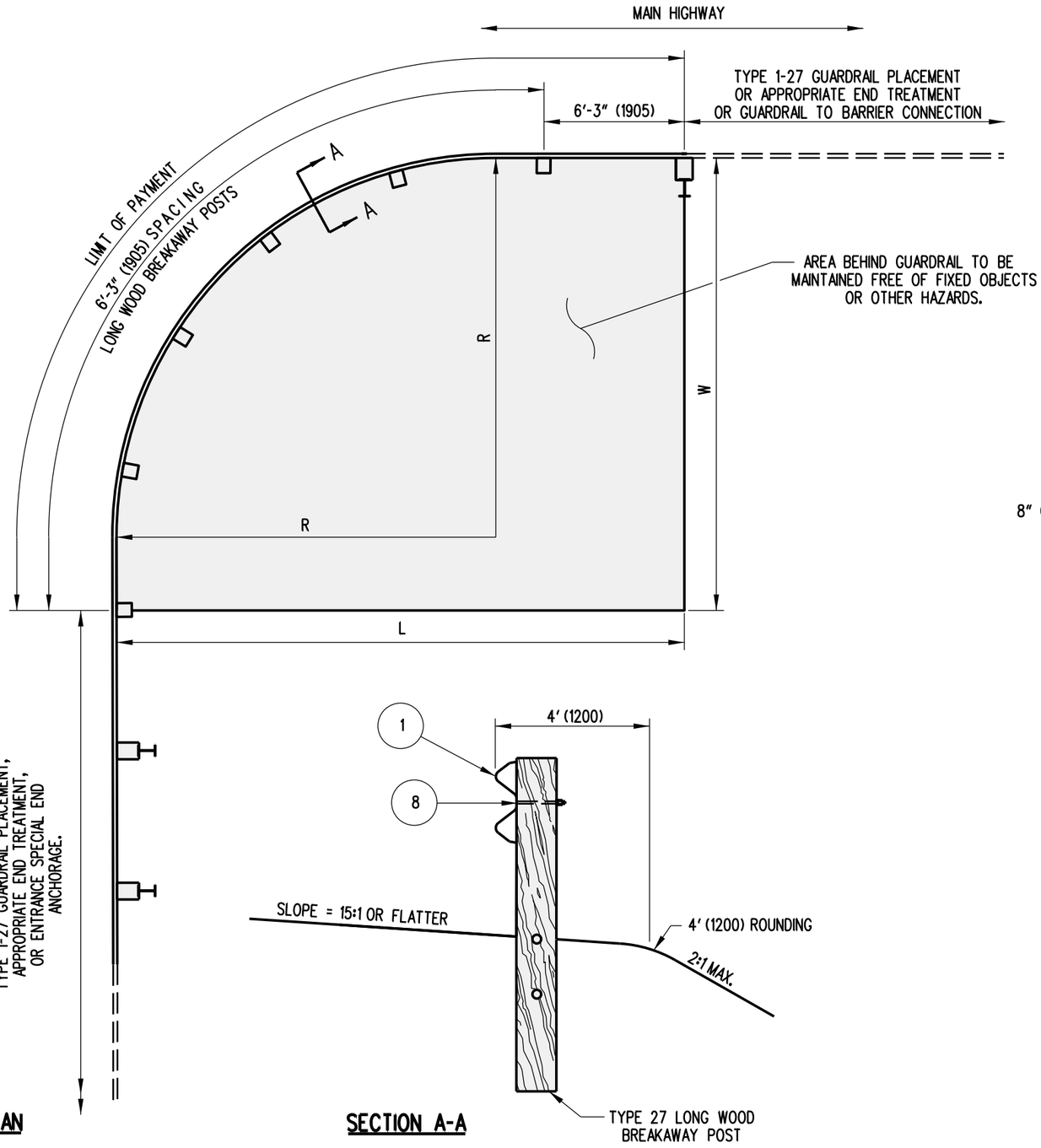
STANDARD NO. B-17 (2010) | **SHT. 1 OF 1**

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/03/2010

SCALE : N.T.S.

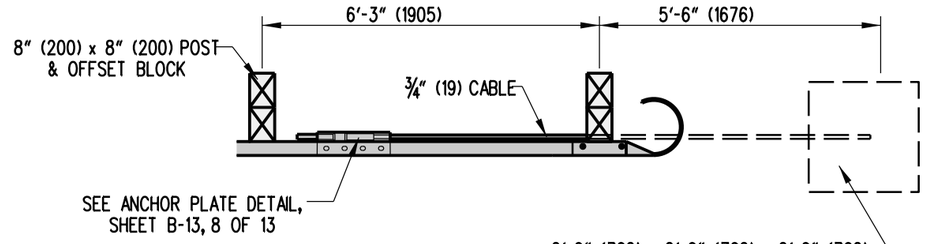


PLAN

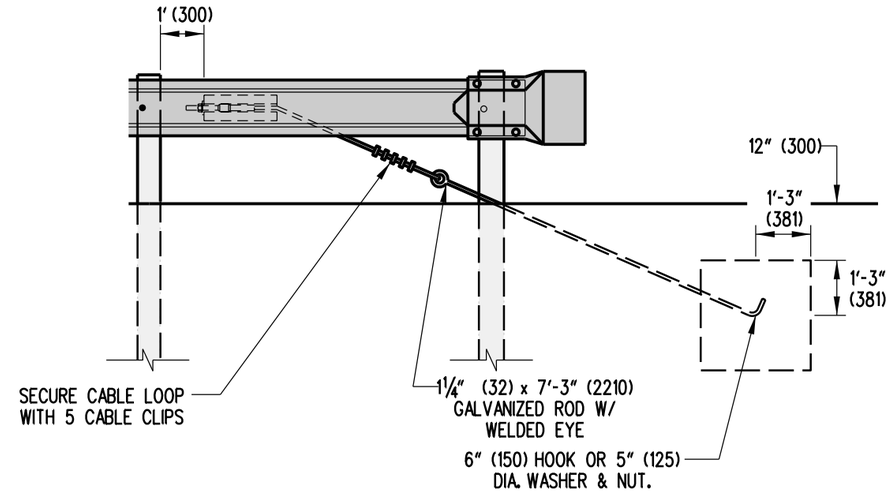
RADIUS	MIN. REQUIRED AREA FREE OF FIXED OBJECTS
	L x W
8'-6" (2600)	25' x 15' (7600 x 4500)
17'-0" (5200)	30' x 15' (9144 x 4500)
25'-6" (7800)	40' x 20' (1200 x 6000)
35'-0" (10700)	50' x 20' (15200 x 6000)

NOTES:

1). NO WASHERS ARE USED ON THE RAIL SIDE OF THE LONG WOOD BREAKAWAY POSTS.
2). THE CURVED GUARDRAIL SECTION SHALL BE SHOP BENT.
3). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4). IF CURB IS USED IN CONJUNCTION WITH CURVED GUARDRAIL SECTION, THE CURB CANNOT BE HIGHER THAN 2" (50).
5). ON THE 8'6' (2600) RADIUS SYSTEM ONLY, THE RAIL IS NOT TO BE BOLTED TO THE CENTER POST.



SECTION A-A



ENTRANCE SPECIAL END ANCHORAGE

DELAWARE
DEPARTMENT OF TRANSPORTATION

CURVED GUARDRAIL SECTION

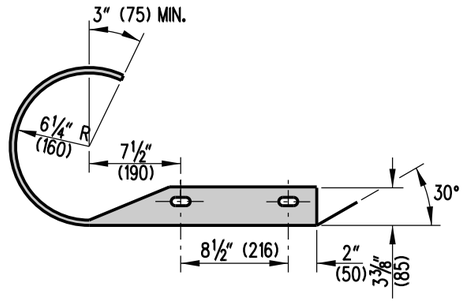
STANDARD NO. B-18 (2010) | **SHT. 1 OF 1**

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

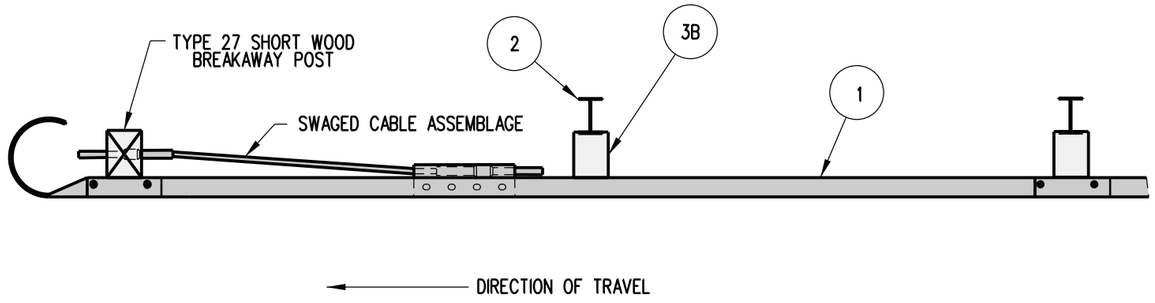
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

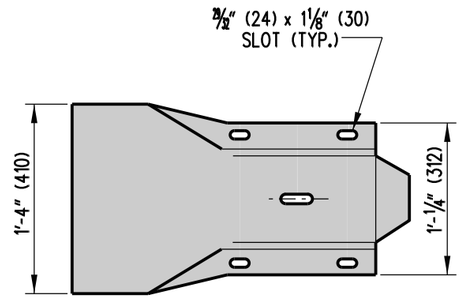
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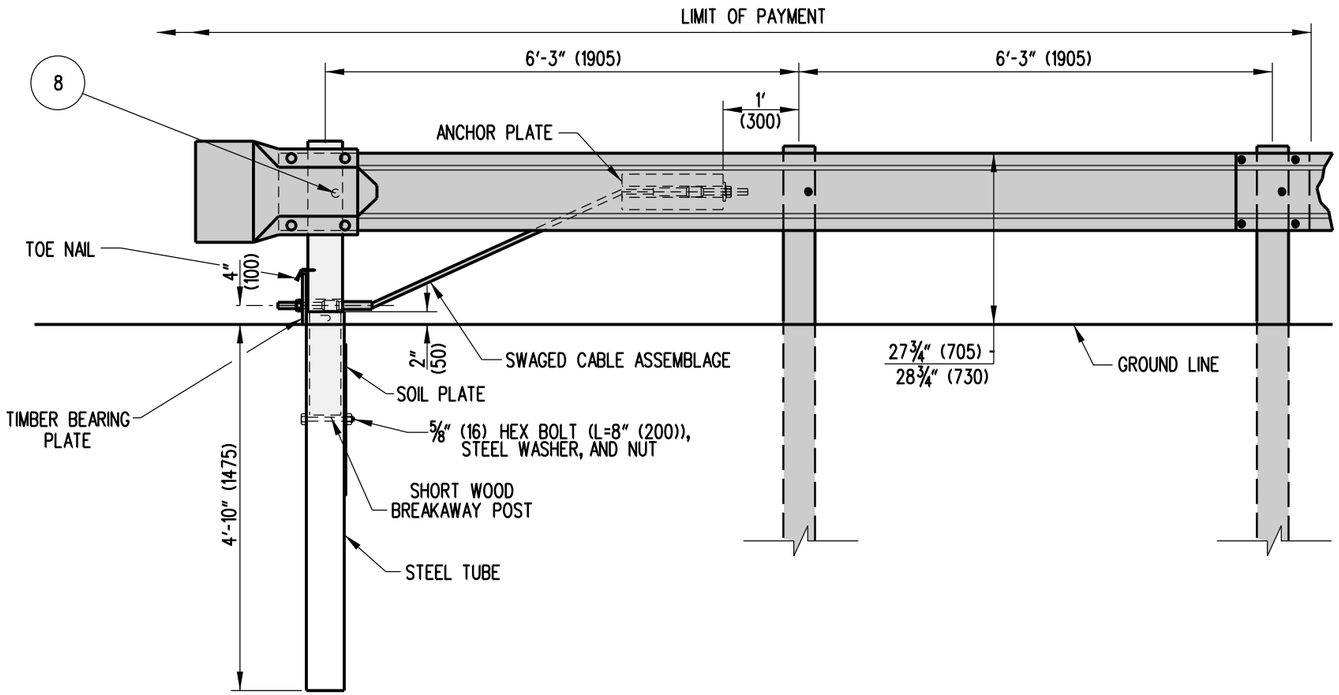
END SECTION PLAN



PLAN



END SECTION ELEVATION



ELEVATION

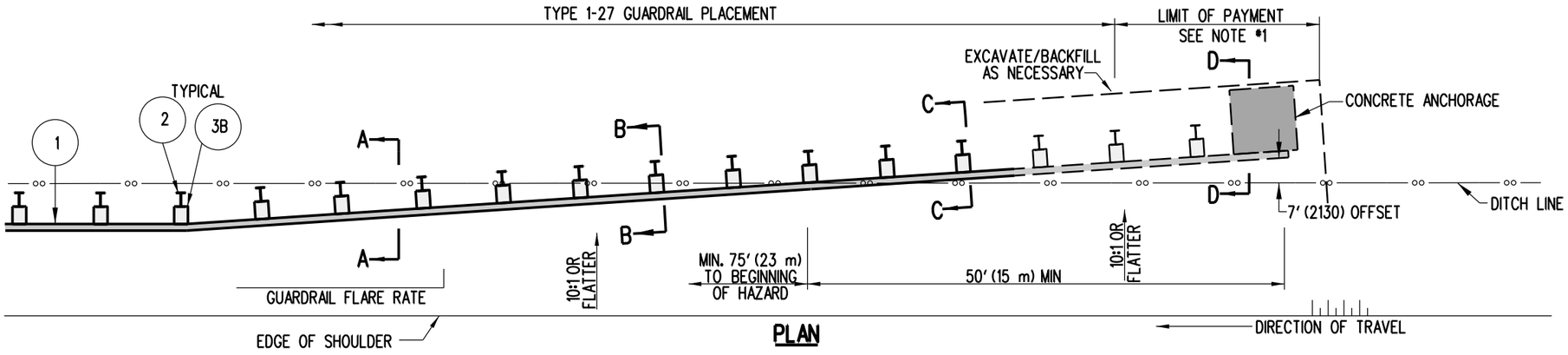
NOTES:

1. ADDITIONAL HOLES FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING. (SEE STANDARD HARDWARE SHEET FOR HOLE SPACING INFORMATION).
2. CONTRACTOR HAS THE OPTION OF USING A 6' (1830) STEEL TUBE WITHOUT A SOIL PLATE OR A 5' (1525) STEEL TUBE WITH A SOIL PLATE.

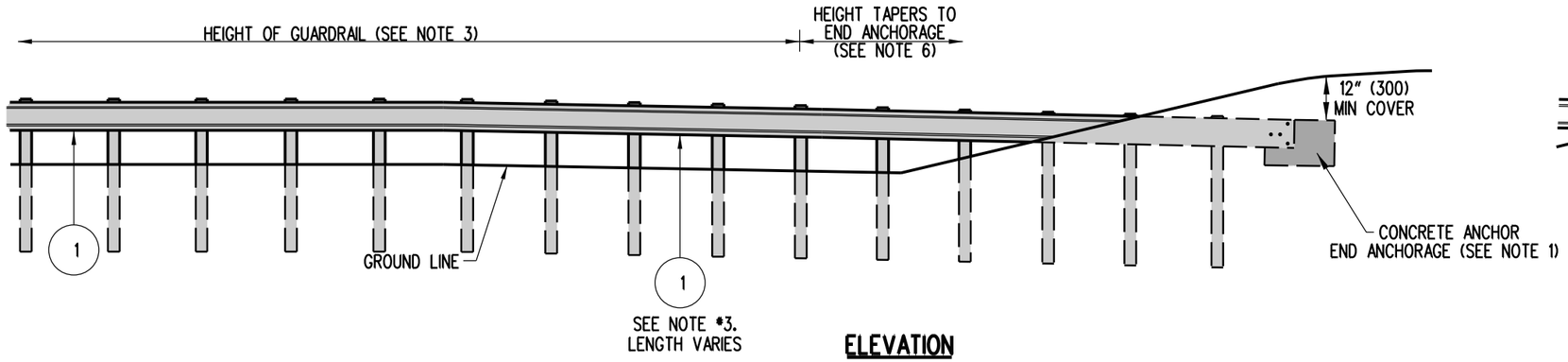
DELAWARE DEPARTMENT OF TRANSPORTATION	END ANCHORAGE, TYPE 27		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-19 (2010)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

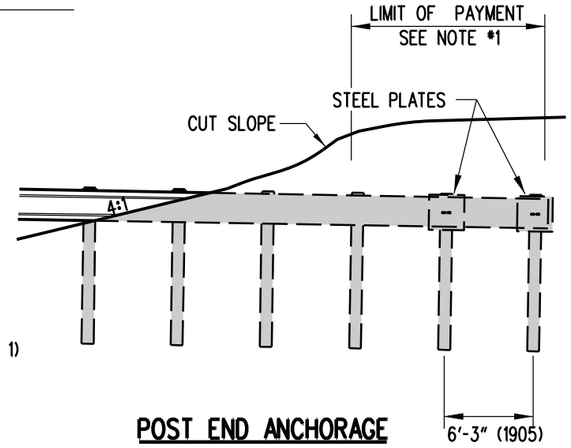
SCALE : N.T.S.



PLAN



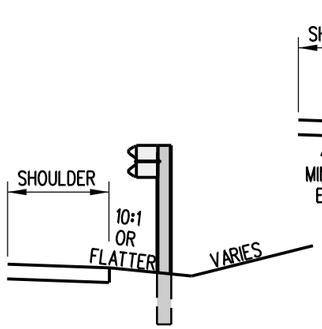
ELEVATION



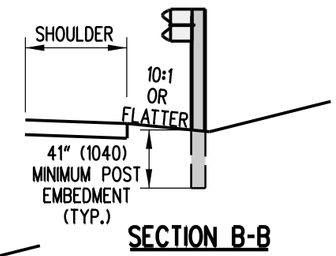
POST END ANCHORAGE

(SINGLE RAIL)

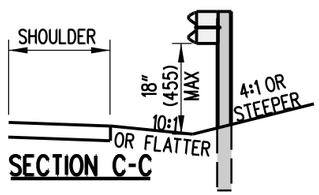
FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1



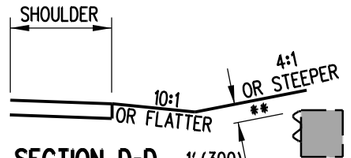
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

ANCHORAGE

** 1' (300) BURIAL IS NOT REQUIRED WHEN ANCHORING IN ROCK.

NOTES:

1). BURIED END SECTION PAYMENT INCLUDES THE CONCRETE OR POST ANCHORAGE, EXCAVATION, BACKFILL, AND ALL APPLICABLE ITEMS INCLUDING LABOR NECESSARY TO COMPLETE END ANCHORAGE.
2). THE CONTRACTOR HAS THE OPTION OF USING EITHER A CONCRETE BLOCK ANCHOR OR A POST ANCHOR TO TERMINATE THE BURIED END SECTION.
3). WHEN PLACING GUARDRAIL ON A 10:1 OR FLATTER SLOPE, THE HEIGHT OF THE GUARDRAIL SHALL BE HELD CONSTANT RELATIVE TO THE GROUND DIRECTLY UNDER THE FACE OF THE GUARDRAIL.
4). ALL POSTS SHALL BE 6' (1800) FOR SINGLE RAIL INSTALLATION.
5). WHEN USING THE BURIED END SECTION, THE DESIGN MUST PROVIDE A MINIMUM OF 75' (23 m) FROM WHERE THE GUARDRAIL CROSSES THE DITCH LINE TO THE BEGINNING OF THE HAZARD.
6). MAINTAIN THE FLARE OF THE GUARDRAIL UNTIL THE 12" (300) COVER HAS BEEN ATTAINED. IF THE 12" (300) COVER CANNOT BE ATTAINED BEFORE THE RAIL IS 7' (2100) BEHIND THE BOTTOM OF THE DITCH, THEN SLOPE THE GUARDRAIL FROM THE POINT WHERE IT CROSSES THE DITCH TO WHERE IT IS 7' (2100) BEHIND THE DITCH, SO THAT IT HAS 12" (300) OF COVER.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BURIED END SECTION

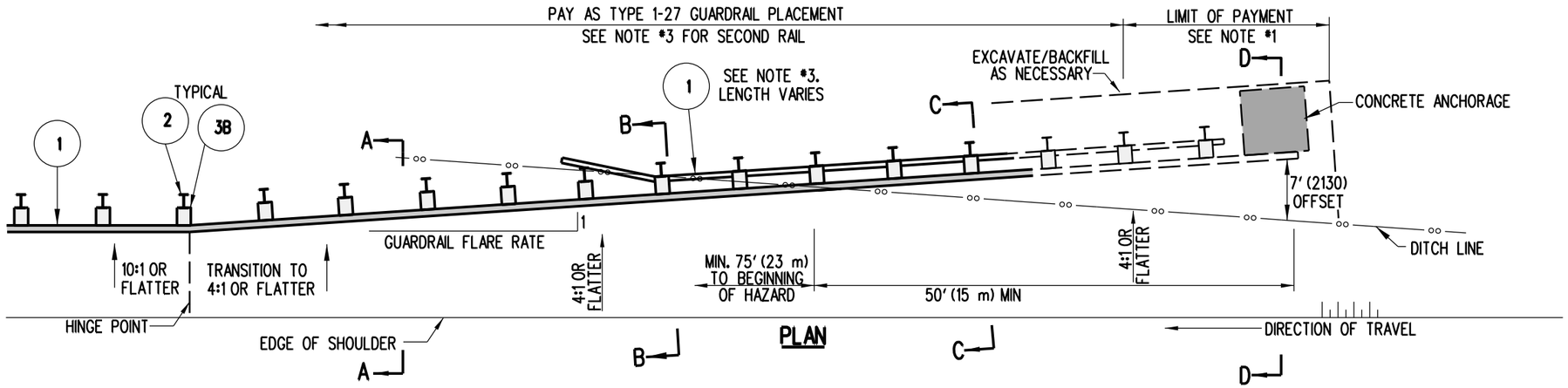
STANDARD NO.	B-20 (2010)	SHT. 1	OF 3

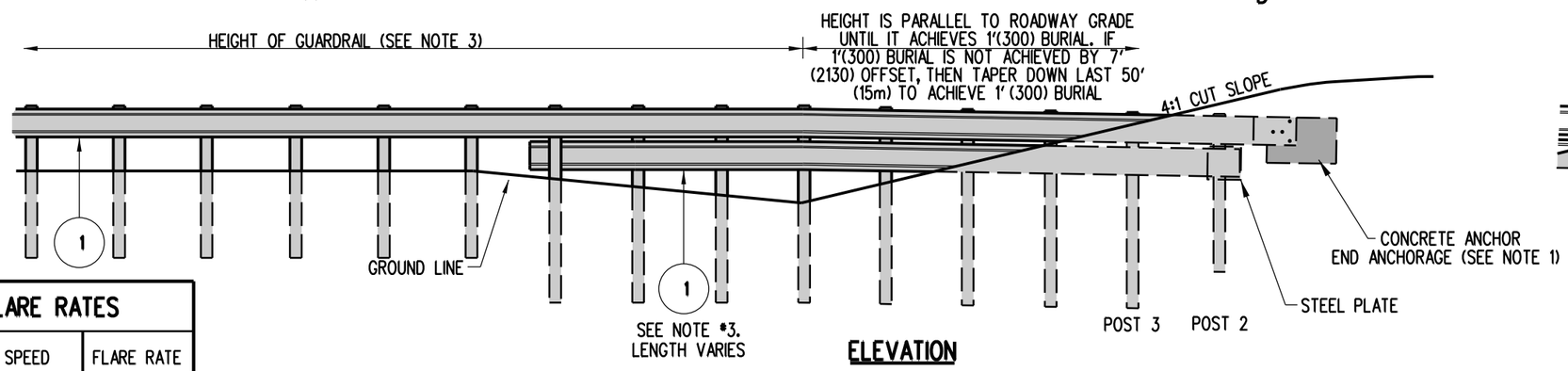
APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 — DATE

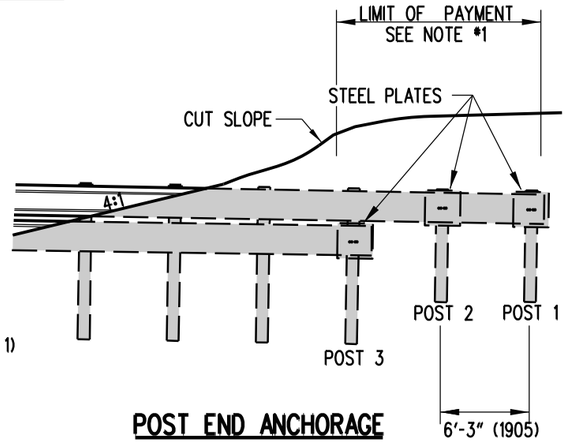
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09/03/2010

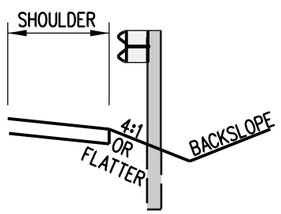
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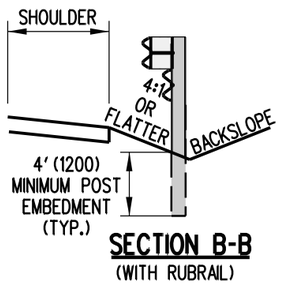


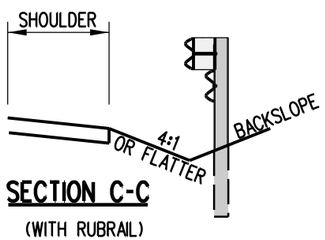


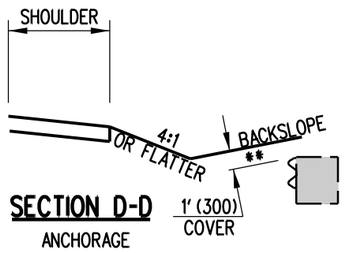


FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1









** 1' (300) BURIAL IS NOT REQUIRED WHEN ANCHORING IN ROCK.

NOTES:

1). BURIED END SECTION PAYMENT INCLUDES THE CONCRETE OR POST ANCHORAGE, EXCAVATION, BACKFILL, AND ALL APPLICABLE ITEMS, INCLUDING LABOR NECESSARY TO COMPLETE END ANCHORAGE.

2). THE CONTRACTOR HAS THE OPTION OF USING EITHER A CONCRETE BLOCK ANCHOR OR A POST ANCHOR TO TERMINATE THE BURIED END SECTION.

3). THE TOP OF THE W-BEAM SHALL BE HELD CONSTANT RELATIVE TO THE ROADWAY PROFILE GRADE UNTIL IT CROSSES THE DITCH FLOW LINE. A SECOND W-BEAM RAIL IS REQUIRED WHEN THE DISTANCE BETWEEN THE GROUND AND THE BOTTOM OF THE TOP RAIL EXCEEDS 18" (450). THE MAXIMUM HEIGHT OF THE DOUBLE RAIL SYSTEM IS 45" (1150). IF NECESSARY, TAPER BOTH RAILS DOWN TO MAINTAIN MAXIMUM HEIGHT. SECOND RAIL SHALL BE PAID FOR AS ADDITIONAL LINEAR FEET (LINEAR METERS) OF TYPE 1-27 OR 1-31 GUARDRAIL.

4). WHEN USING A SECOND RAIL, 8' (2400) LONG POSTS ARE REQUIRED. BEHIND THE DITCHLINE, POSTS MUST PROVIDE 4' (1200) MINIMUM EMBEDMENT (20" (510) WHEN ROCK IS ENCOUNTERED). POSTS FOR THE POST ANCHOR SHALL BE 6' (1800) LONG.

5). WHEN USING THE BURIED END SECTION, THE DESIGN MUST PROVIDE A MINIMUM OF 75' (23 m) FROM WHERE THE GUARDRAIL CROSSES THE DITCH LINE TO THE BEGINNING OF THE HAZARD.

6). MAINTAIN THE FLARE OF THE GUARDRAIL UNTIL THE 12" (300) COVER HAS BEEN ATTAINED. IF THE 12" (300) COVER CANNOT BE ATTAINED BEFORE THE RAIL IS 7' (2100) BEHIND THE BOTTOM OF THE DITCH, THEN SLOPE THE GUARDRAIL FROM THE POINT WHERE IT CROSSES THE DITCH TO WHERE IT IS 7' (2100) BEHIND THE DITCH, SO THAT IT HAS 12" (300) OF COVER.

DELAWARE
DEPARTMENT OF TRANSPORTATION

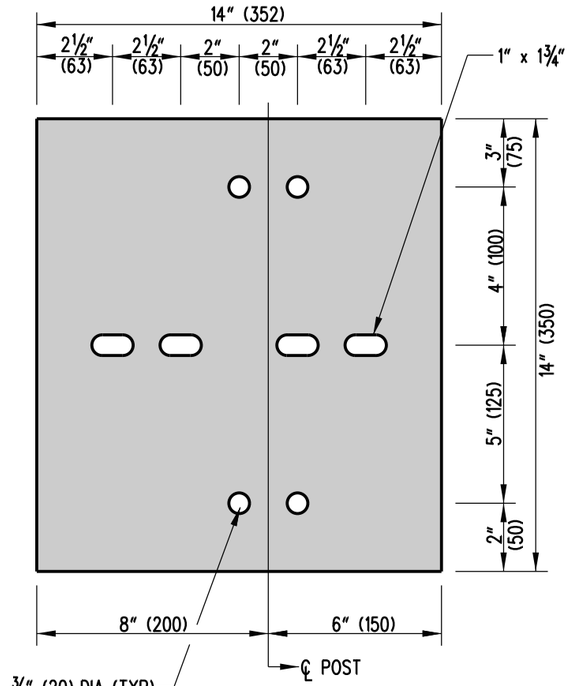
BURIED END SECTION - DOUBLE RAIL SYSTEM

STANDARD NO. B-20 (2010) | **SHT.** 2 **OF** 3

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

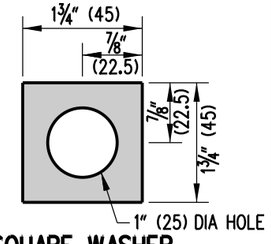
09/03/2010



STEEL PLATE - ½" (13) THICK

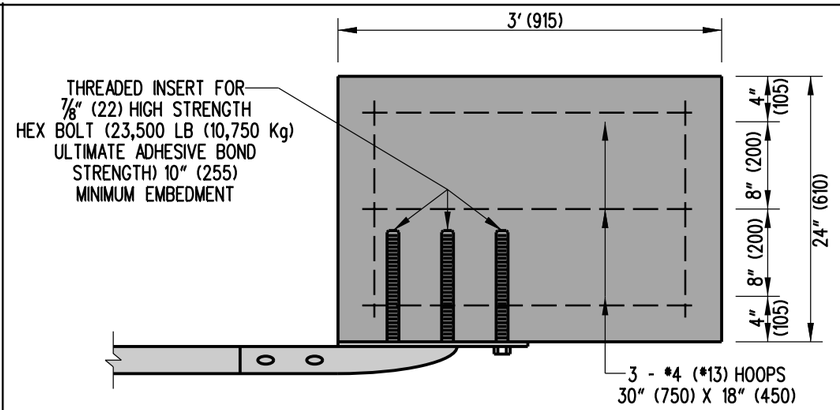
GALVANIZED

NOTE: ALL HOLES TO BE DRILLED PRIOR TO GALVANIZING.

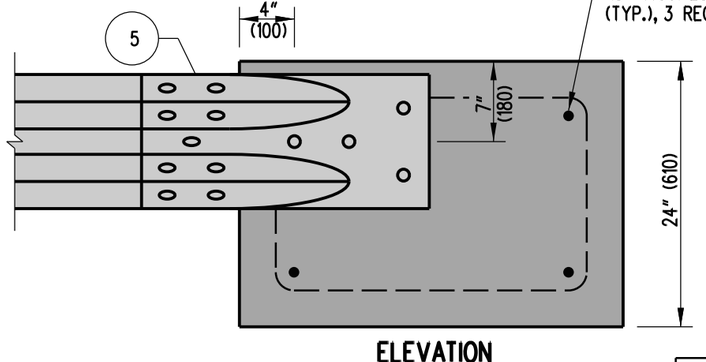


SQUARE WASHER

¼" (6) THICK - GALVANIZED



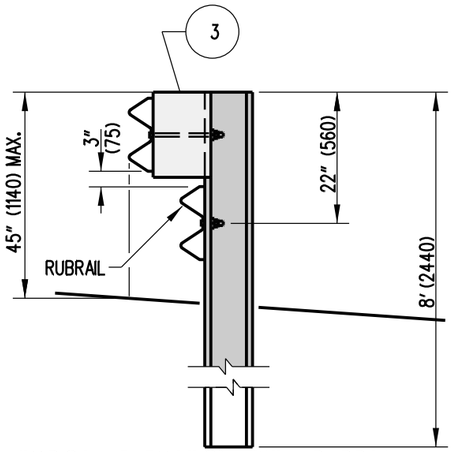
PLAN



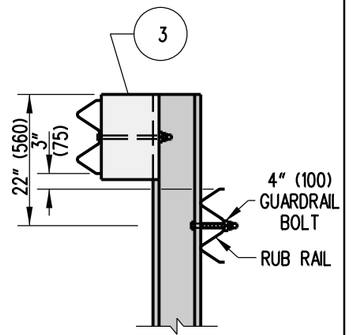
ELEVATION

CONCRETE BLOCK ANCHOR

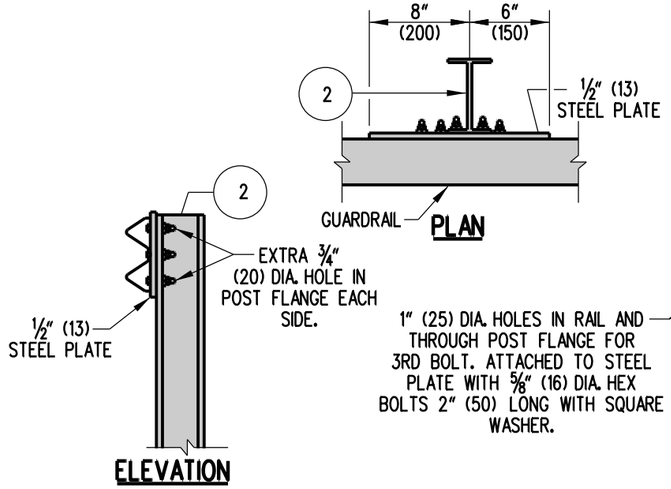
SCALE : N.T.S.



TYPICAL ELEVATION WITH RUBRAIL



ELEVATION

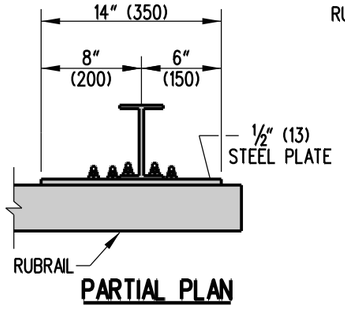


PLAN

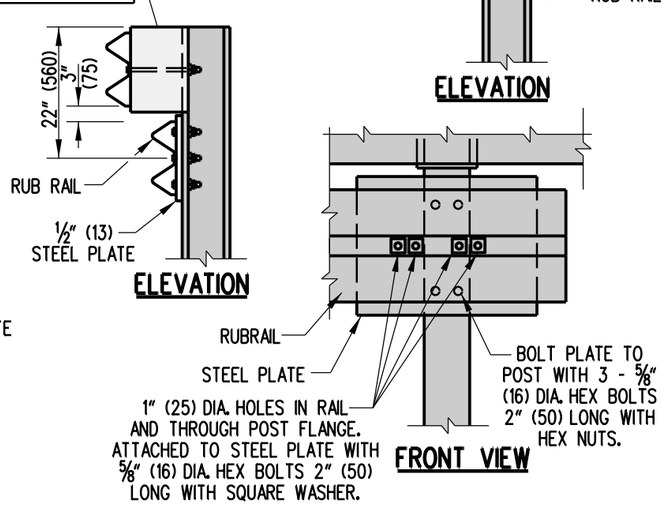
ELEVATION

FRONT VIEW

POST ANCHOR DETAIL



PARTIAL PLAN



ELEVATION

FRONT VIEW

RUBRAIL ANCHOR ATTACHMENT

DELAWARE
DEPARTMENT OF TRANSPORTATION

BURIED END SECTION

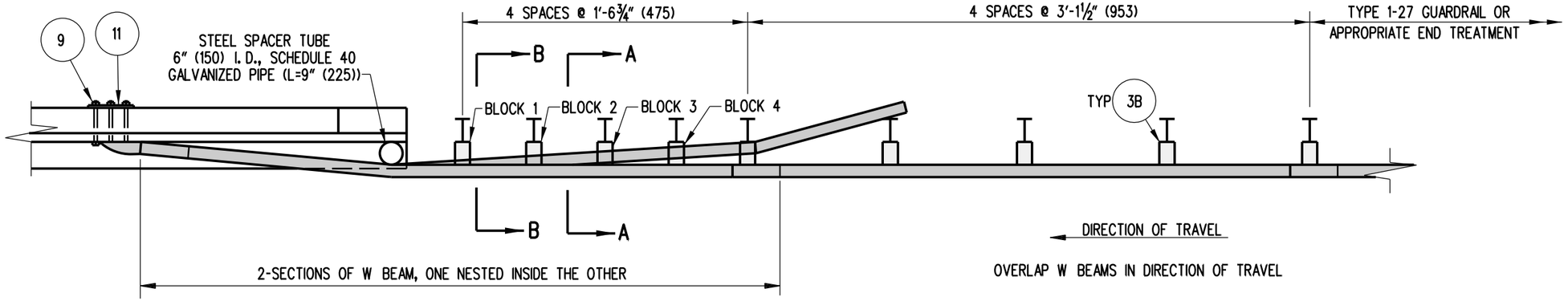
STANDARD NO. B-20 (2010) | **SHT.** 3 **OF** 3

APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

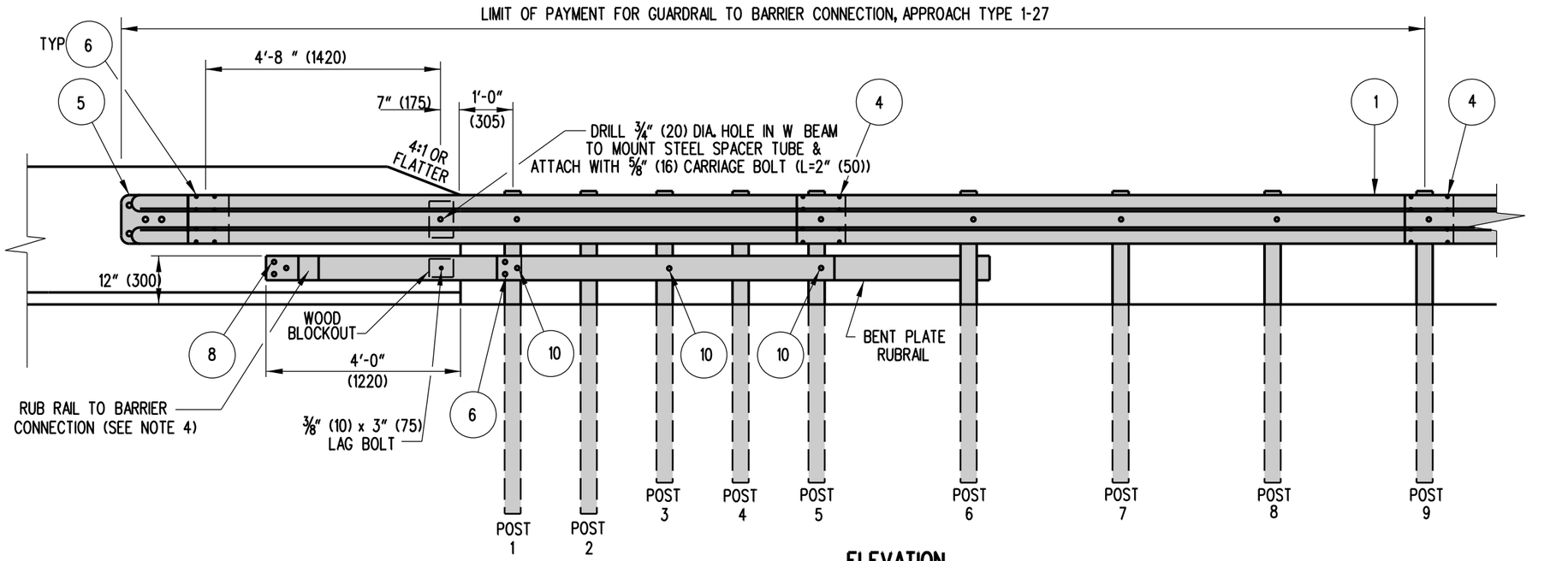
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

12/17/2010

SCALE : N.T.S.



PLAN



ELEVATION

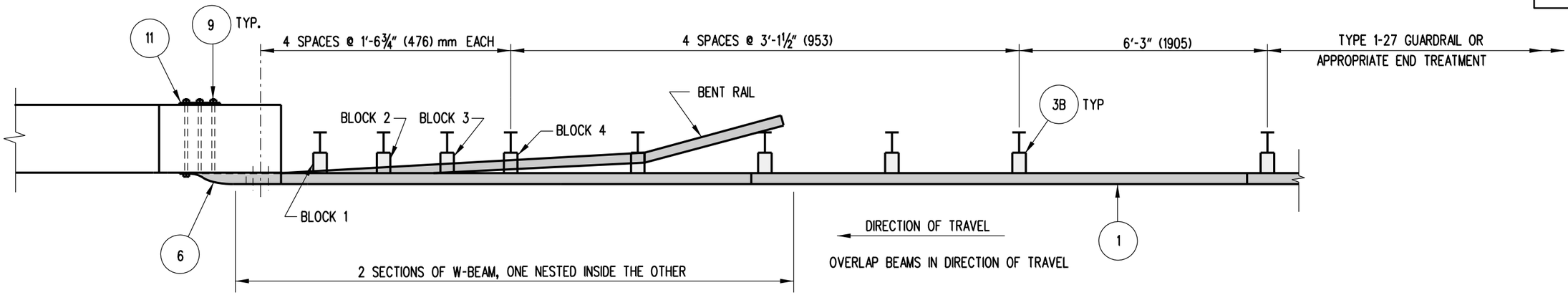
NOTES:

1). THE W-BEAM AND RUB RAIL ARE NOT BOLTED TO POSTS AT POSTS 2 THROUGH 4.
2). POSTS 1 THROUGH 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER WOOD BLOCKS AND/OR RUBRAIL AND WOOD BLOCK
3). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR ⅝" (16) BOLT) BETWEEN HEADS AND RUB RAIL.
4). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
5). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
6). APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
7). POSTS 1 & 2 ARE W8x13 (W200x19.3), 7'-6' (2.28m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9 (W150x13.5), 6'-0" (1.82m) LONG.
8). SEE DETAIL B-5, SHEETS 2 AND 3 OF 6 FOR HARDWARE DETAILS.

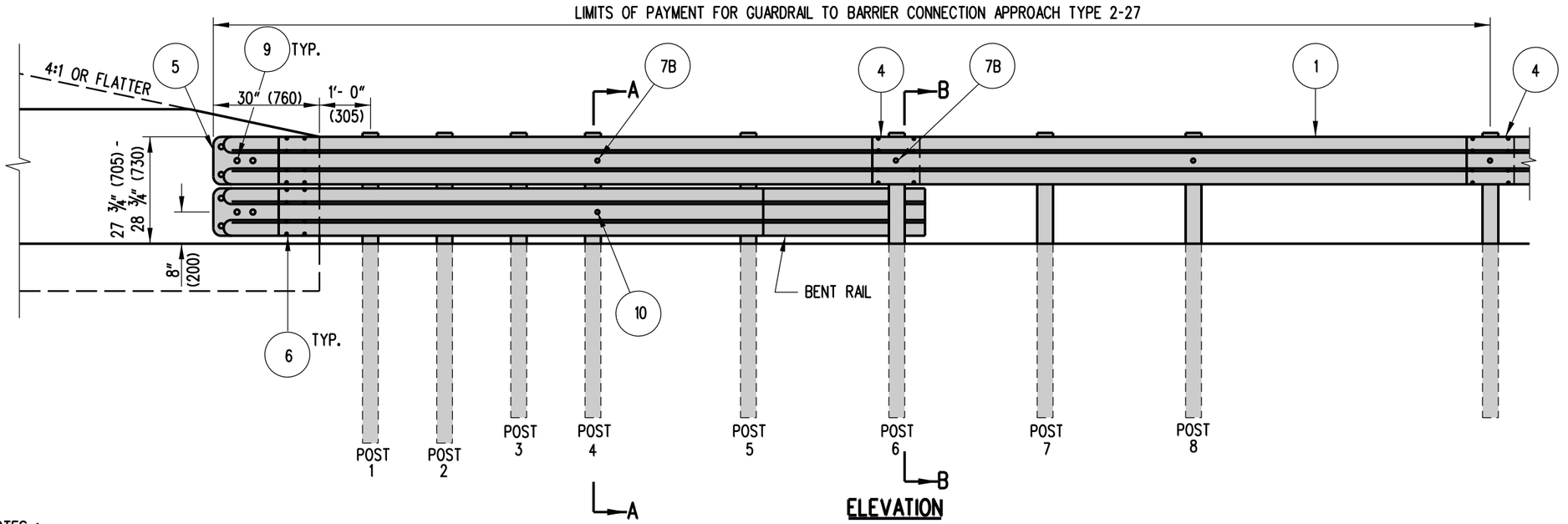
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27		APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE
	STANDARD NO. B-21 (2010)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/20/2010

SCALE : N.T.S.



PLAN



ELEVATION

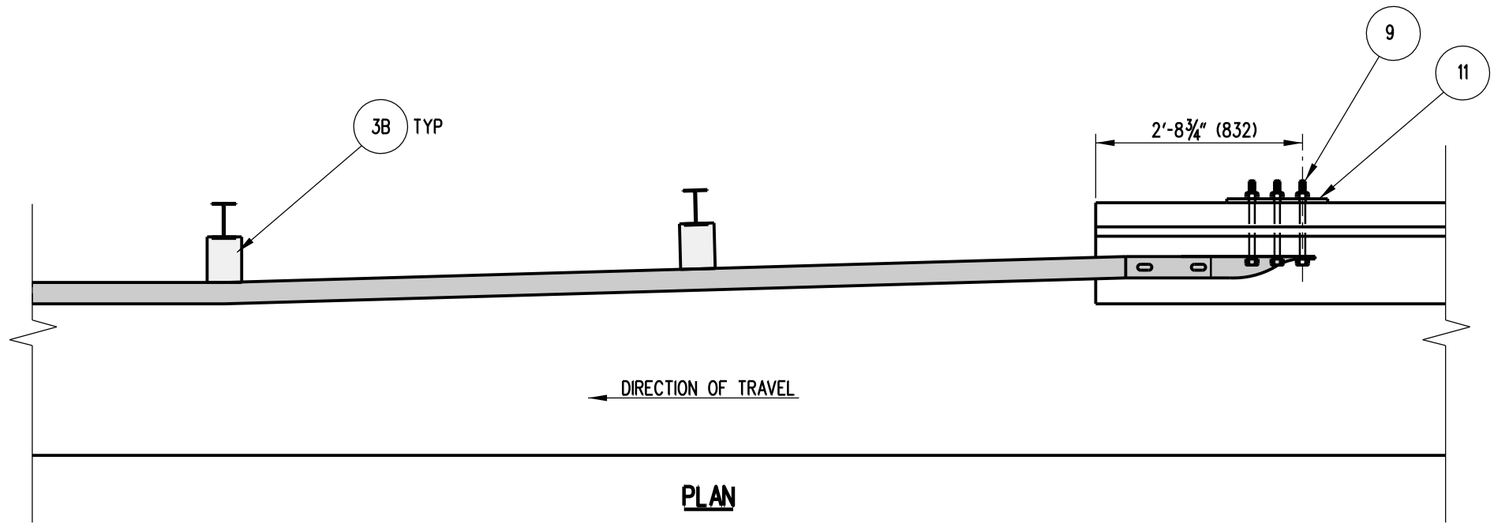
NOTES :

1). CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
2). POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
3). DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
4). POSTS 1 AND 2 ARE W8x13 (W200x19.3), 7'-6" (2.28m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9 (w150x13.5), 6'-0" (1.82m) LONG.
5). BENT RAIL MAY BE SHOP BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
6). APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
7). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
8). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
9). FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
10). SEE DETAIL B-5, SHEET 5 OF 6 FOR HARDWARE DETAILS.
11). BENT RAIL SHALL BE BOLTED TO THE BACK OF POST 6 WITH A ⅝" (16) GUARDRAIL BOLT, 4" (200) LONG, WASHER, AND NUT.

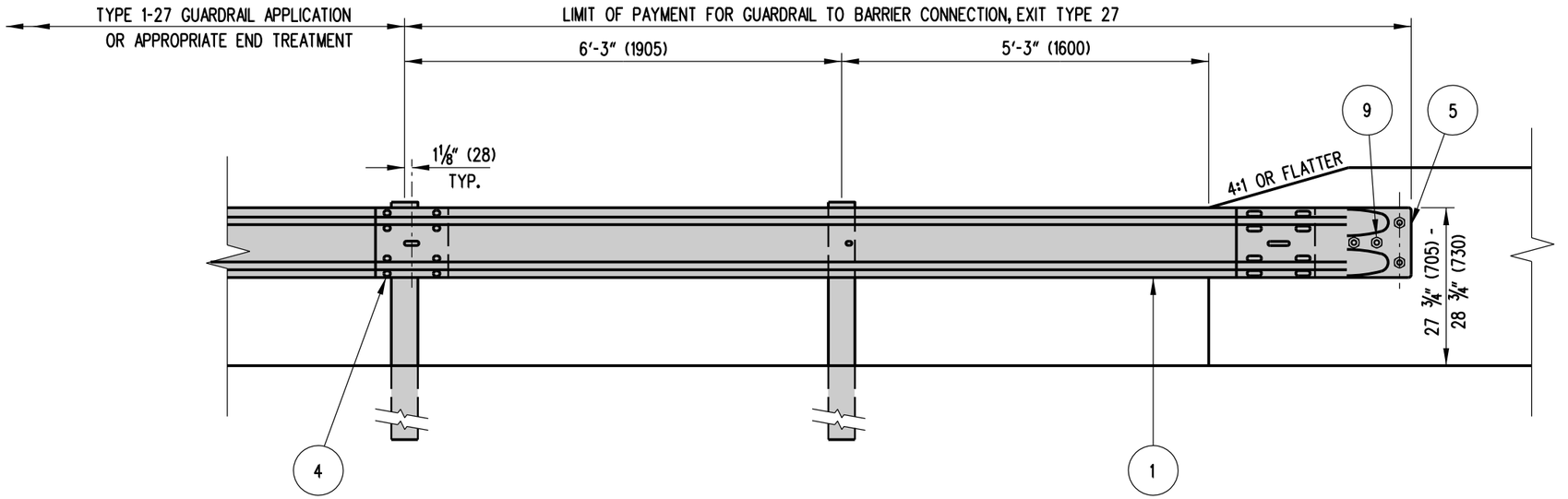
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-27		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-21 (2010)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/20/2010

SCALE : N.T.S.



PLAN



ELEVATION

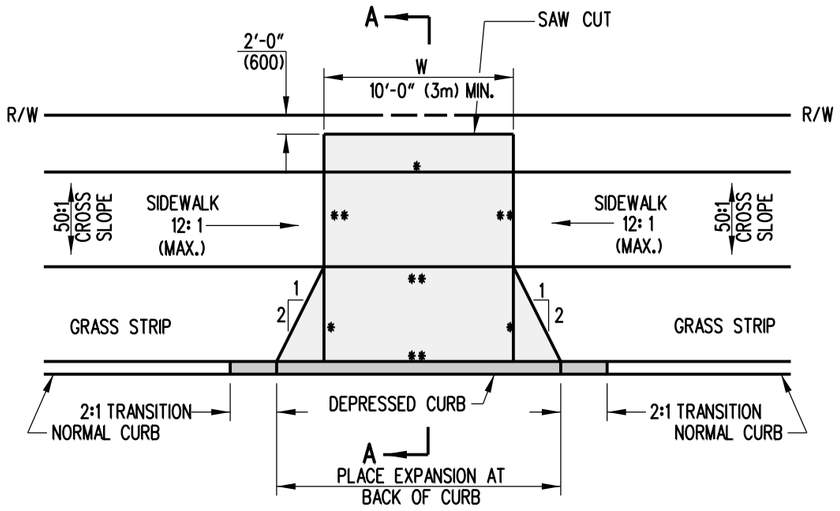
NOTES:

1). CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTO TO PARAPET.
2). GUARDRAIL SECTION AND TERMINAL CONNECTORS SHALL BE OVERLAPPED IN THE DIRECTION OF TRAVEL
3). INSTALLATION SHOWN ABOVE WITH AN 'F-TYPE' BARRIER FACE. GUARDRAIL SECTION OF BARRIER CONNECTION SHALL BE ADJUSTED HORIZONTALLY IN ORDER TO MEET FLUSH AGAINST VARIOUS TYPES OF WALLS AND BARRIERS.

DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 27	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-21 (2010) SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

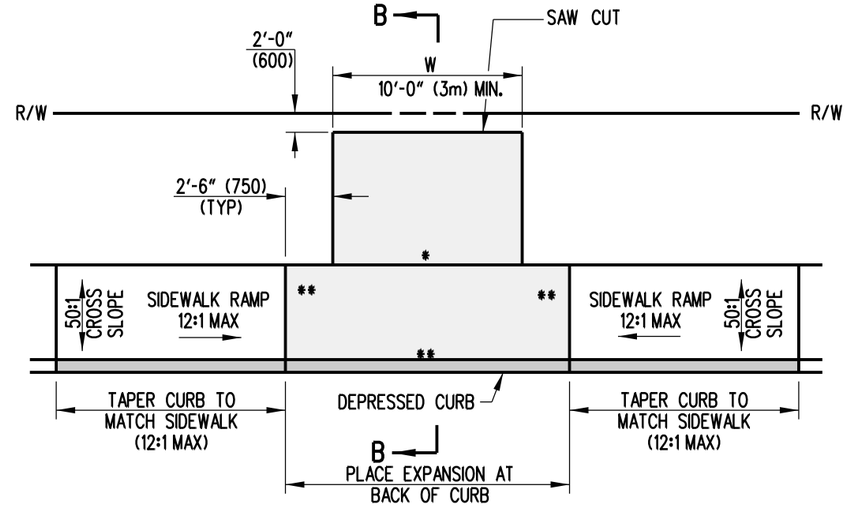
09/20/2010

SCALE : N.T.S.



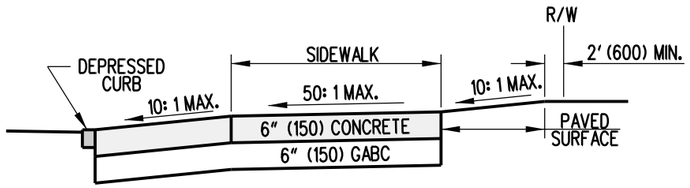
ENTRANCE WITH SIDEWALK AND GRASS STRIP

* - JOINT
** - EXPANSION MATERIAL

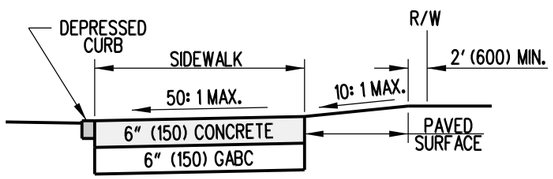


ENTRANCE WITH SIDEWALK AND NO GRASS STRIP

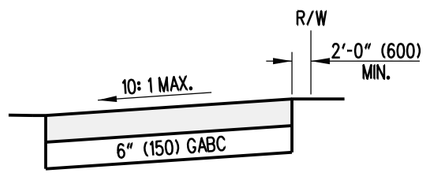
* - JOINT
** - EXPANSION MATERIAL



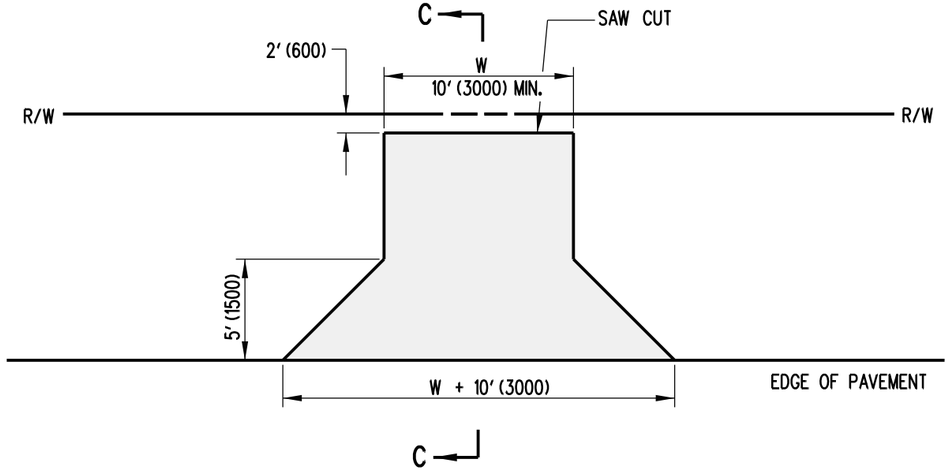
SECTION A-A



SECTION B-B



SECTION C-C



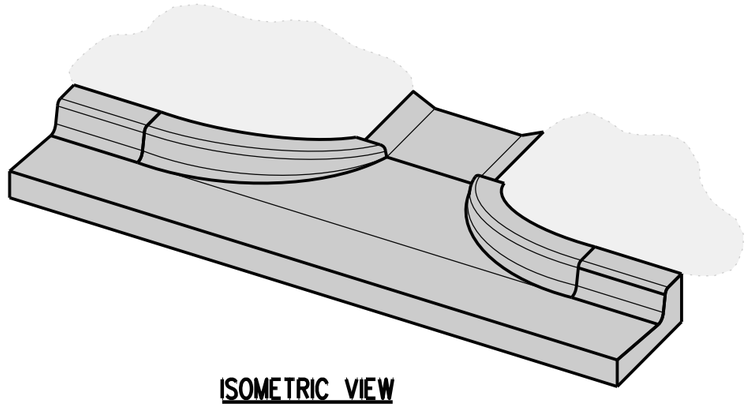
ENTRANCE WITHOUT SIDEWALK

NOTE: IF WIDTH OF DRIVEWAY IS 15' (4.5m) OR GREATER, THE FLARE AND EXTENSIONS CAN BE OMITTED.

DELAWARE DEPARTMENT OF TRANSPORTATION	ENTRANCES	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. C-3 (2010) — SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

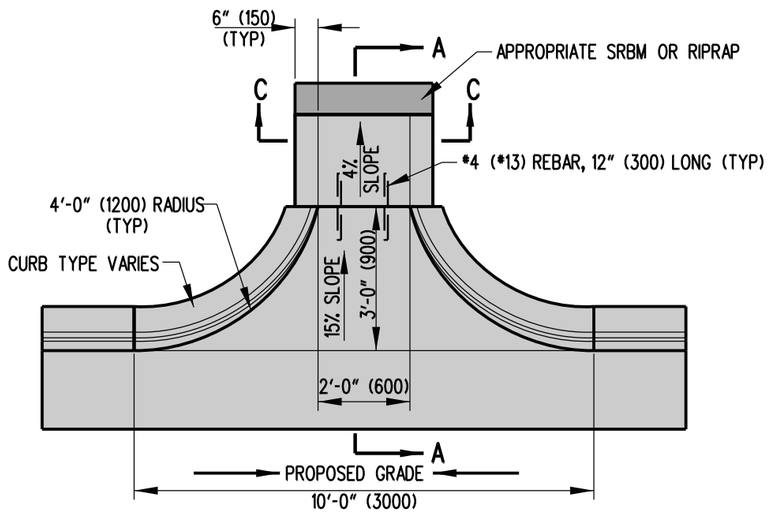
10/25/2010

SCALE : N.T.S.



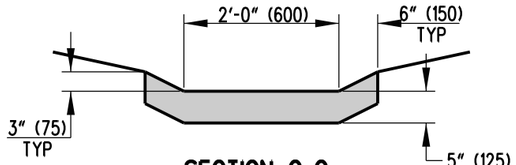
ISOMETRIC VIEW

SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1

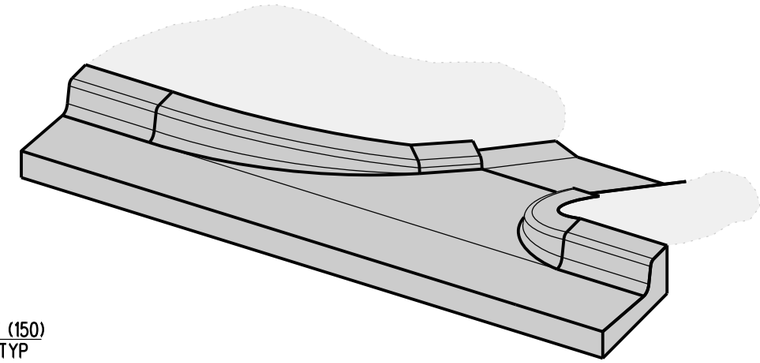


PLAN VIEW

IN SUMP LOCATION

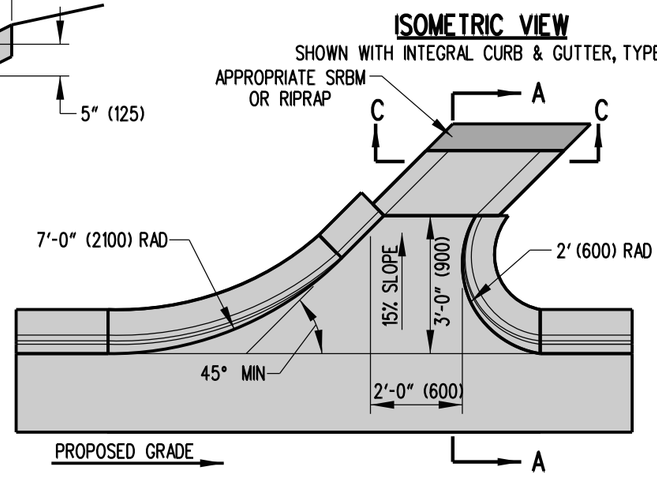


SECTION C-C



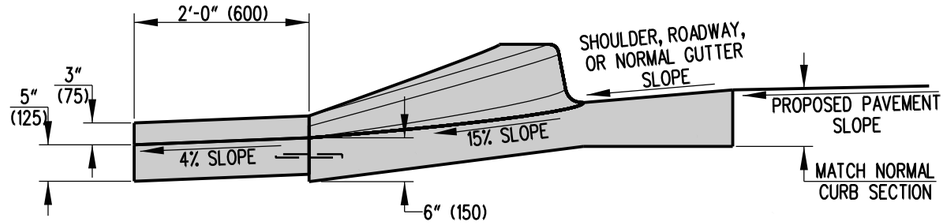
ISOMETRIC VIEW

SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1



PLAN VIEW

ON GRADE OR SLOPE

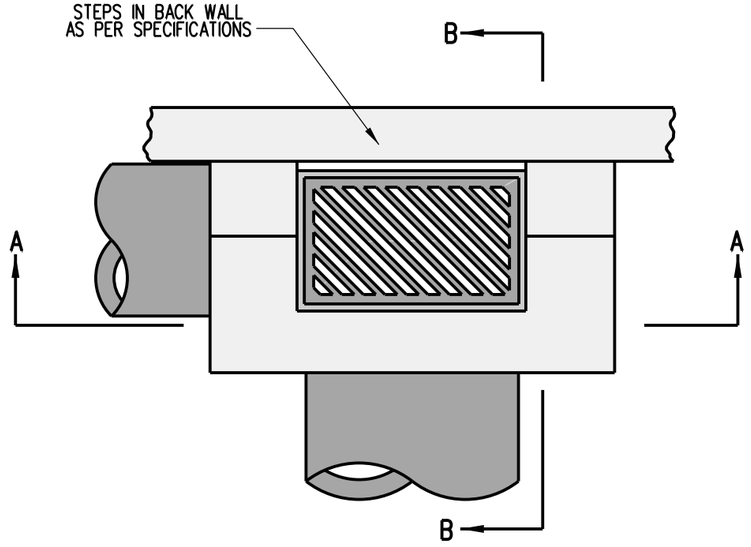


SECTION A-A

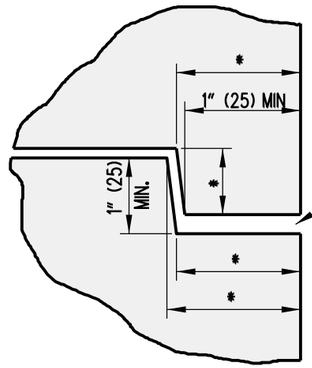
DELAWARE DEPARTMENT OF TRANSPORTATION	**CURB OPENING DETAILS**		**APPROVED** SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. C-4 (2010)	**SHT. 1 OF 1**	**RECOMMENDED** SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

06/29/2010

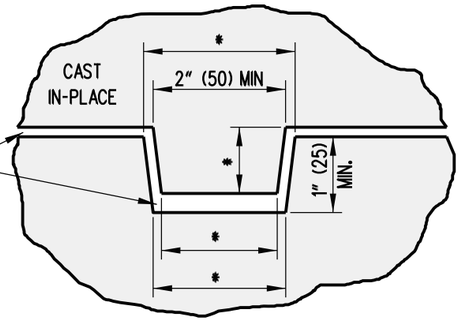
SCALE : N.T.S.



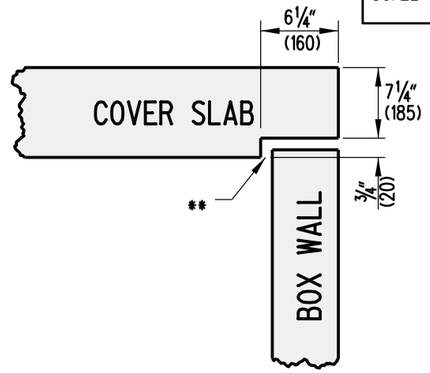
PLAN



TYPE 1 JOINT DETAIL



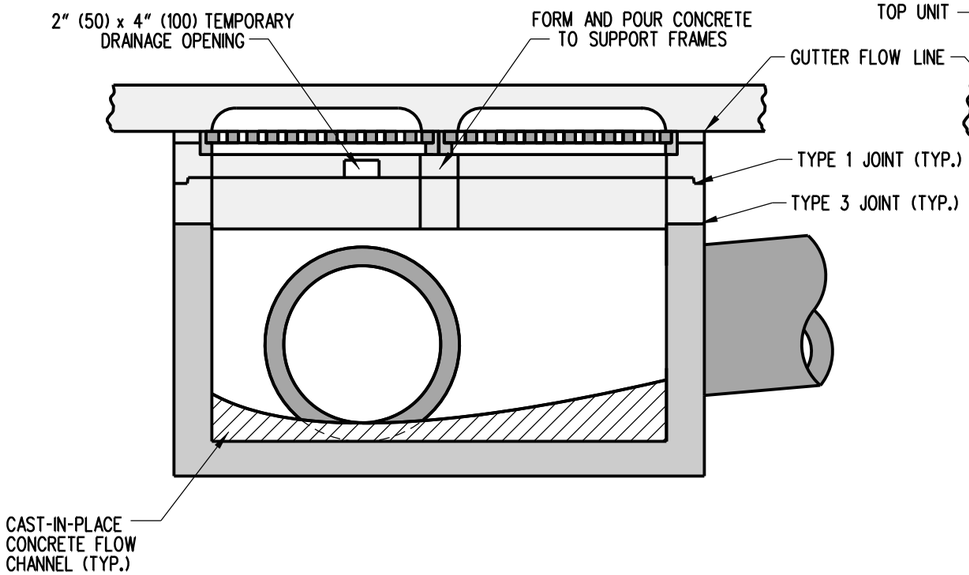
TYPE 2 JOINT DETAIL



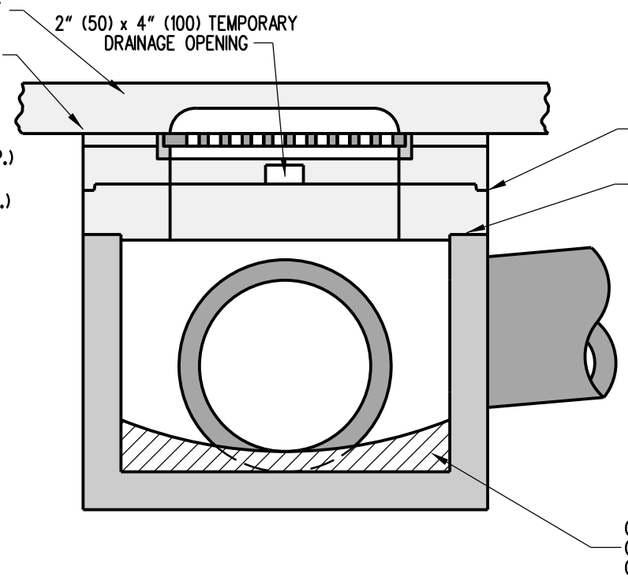
TYPE 3 JOINT DETAIL

* DIMENSIONS WILL VARY

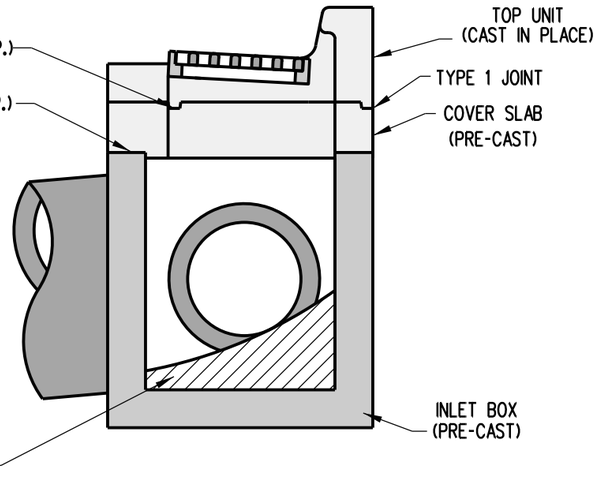
** JOINT SEALANT AS PER SPECIFICATIONS
ONLY BETWEEN 2 PRECAST UNITS



DOUBLE INLET SECTION



SECTION A-A



SECTION B-B

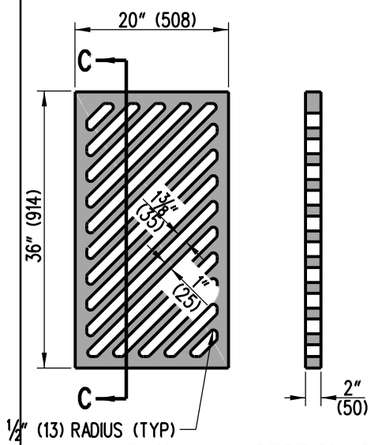
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET ASSEMBLY		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010)	SHT. 1 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/26/2010

DRAINAGE INLET FRAME AND GRATES

SCALE : N.T.S.

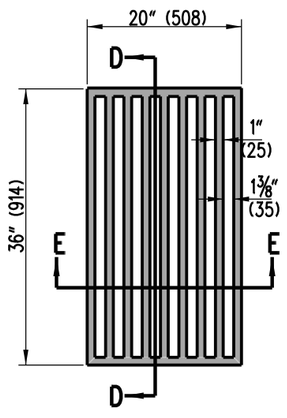
TYPE 1



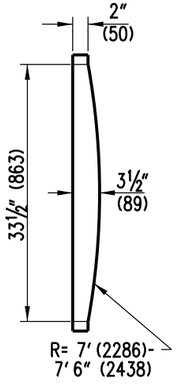
PLAN

SECTION C-C

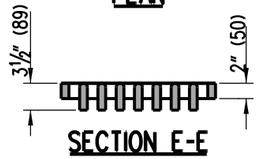
TYPE 2



PLAN

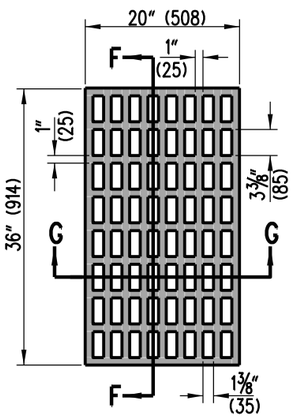


SECTION D-D

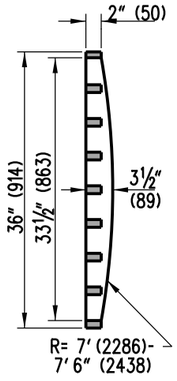


SECTION E-E

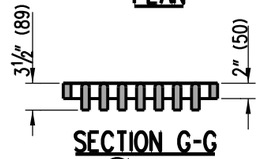
TYPE 3



PLAN

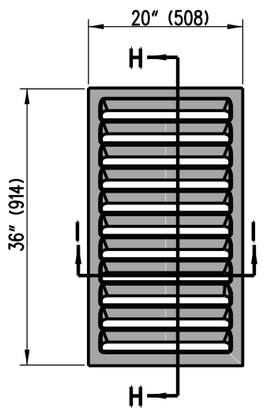


SECTION F-F

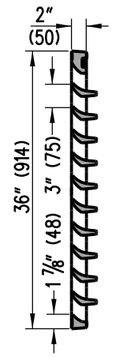


SECTION G-G

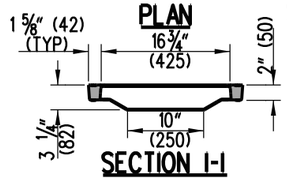
TYPE 4



PLAN

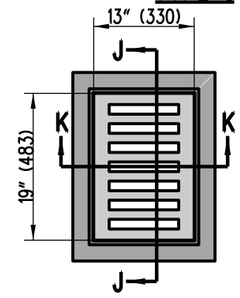


SECTION H-H

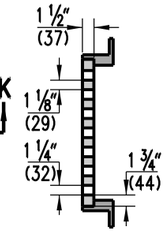


SECTION I-I

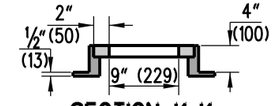
TYPE 5



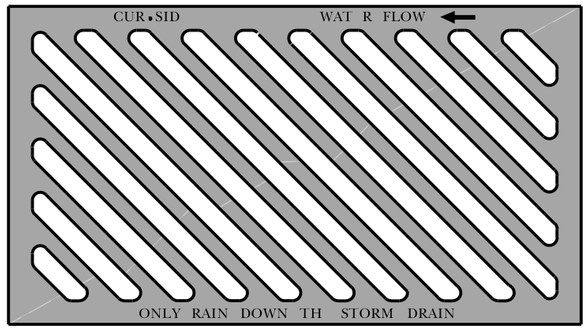
PLAN



SECTION J-J

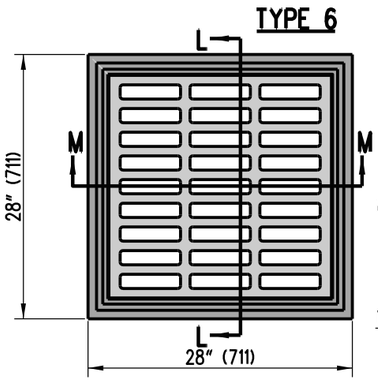


SECTION K-K

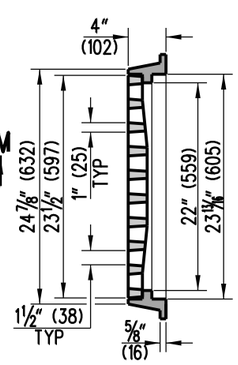


DRAINAGE GRATE LABELING EXAMPLE DETAIL

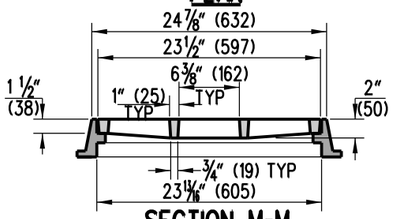
TYPE 6



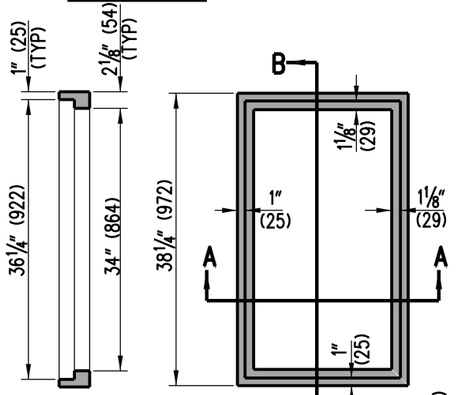
PLAN



SECTION L-L



SECTION M-M



SECTION B-B

SECTION A-A

DRAINAGE INLET FRAME

THIS FRAME IS TO BE USED WITH TYPES 1 THROUGH 4 GRATES ONLY.

NOTES:

1). THE TYPE 2 DRAINAGE INLET GRATE SHALL NOT BE INSTALLED WHERE BICYCLE TRAFFIC MAY BE PRESENT.

2). THE TOP OF ALL DRAINAGE INLET GRATES SHALL BE LABELED "ONLY RAIN DOWN THE STORM DRAIN". ALSO, DRAINAGE INLET GRATES TYPE 1 AND TYPE 4 SHALL BE LABELED WITH "WATER FLOW" AND AN ARROW INDICATING FLOW DIRECTION AS SHOWN IN THE EXAMPLE DETAIL.

3). THE TYPE 1 DRAINAGE INLET GRATE SHALL BE LABELED WITH "CURBSIDE" AS SHOWN ON THE EXAMPLE DETAIL. ALL LABELING ON THE TYPE 1 SHALL BE ON BOTH TOP AND BOTTOM SIDES DUE TO THE TYPE 1 BEING REVERSIBLE.

4). THE TYPE 5 & 6 FRAME AND GRATE COMBINATIONS ARE TO BE USED IN CONJUNCTION WITH LAWN INLET BOXES ONLY. SEE SCHEDULE ON DETAIL D-4, SHEET 1 OF 1, FOR WHICH BOX SIZES ARE CONSIDERED LAWN INLET BOXES.

5). THE TYPE 6 FRAME AND GRATE COMBINATION SHOWN IS THE NEENAH FOUNDRY FRAME AND GRATE COMBINATION MODEL NF-1878-A5G, AN ACCEPTABLE ALTERNATIVE IS THE EAST JORDAN IRON WORKS FRAME AND GRATE COMBINATION MODEL V-5622.

DELAWARE
DEPARTMENT OF TRANSPORTATION

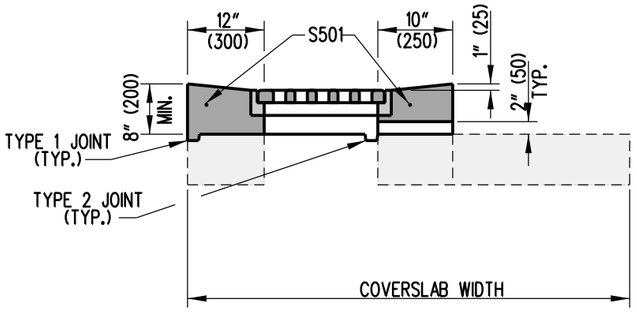
DRAINAGE INLET FRAME AND GRATES

STANDARD NO. D-5 (2010) | SHT. 2 OF 9

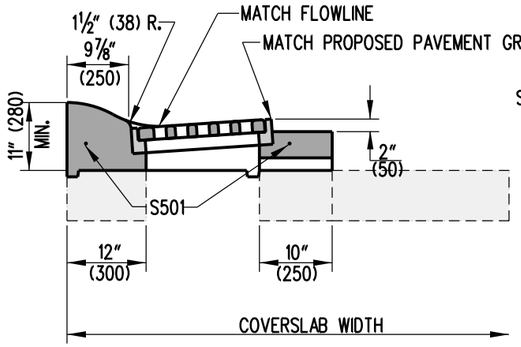
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RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

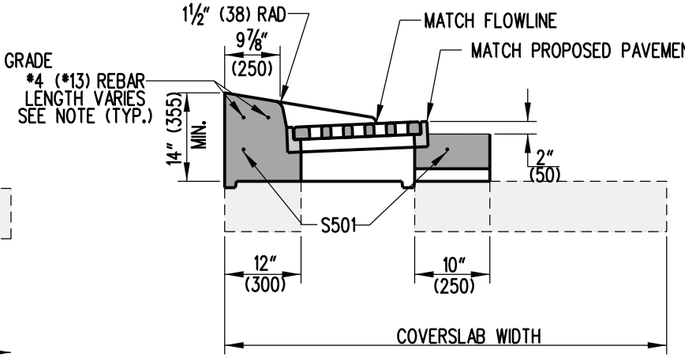
SCALE : N.T.S.



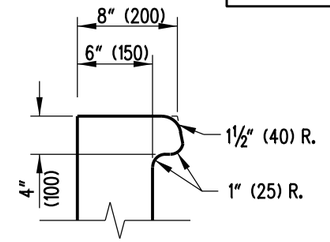
TYPE A



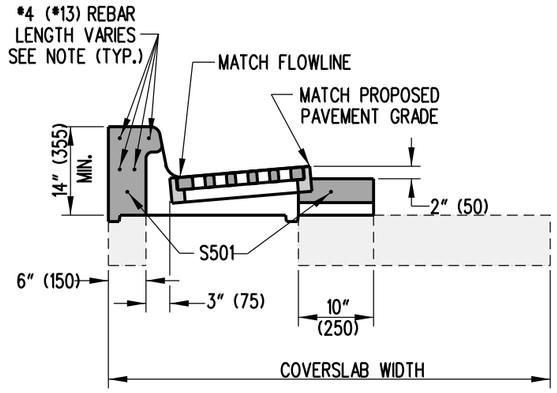
TYPE D



TYPE E

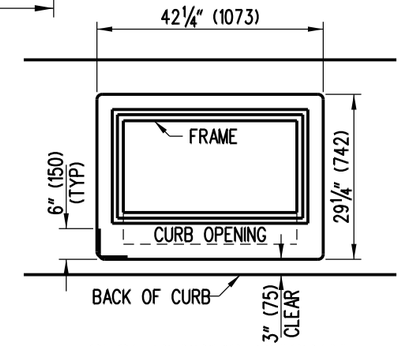


CURB OPENING DETAIL



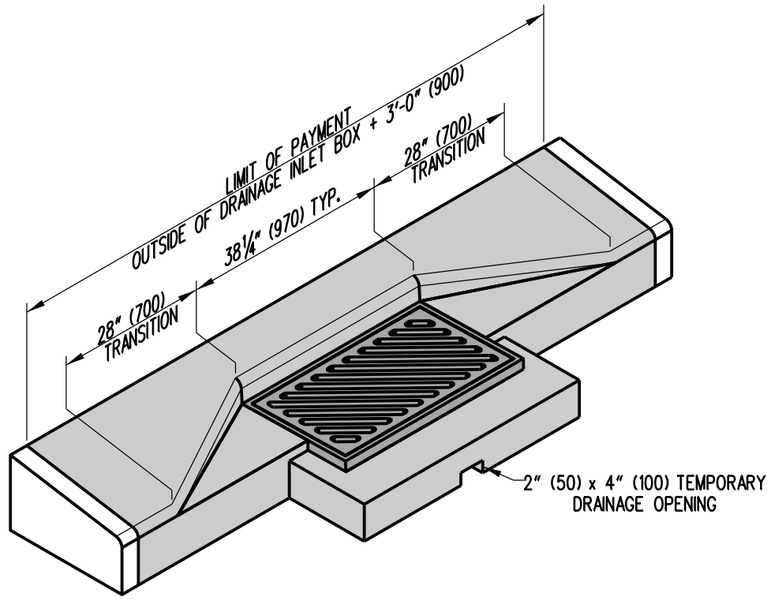
TYPE B

INLET TOP UNIT APPLICATIONS	
TOP UNIT	CURB
TYPE A	USE IN DRAINAGE SWALE
TYPE B	INTEGRAL PCC CURB & GUTTER, TYPE 1 & 3, PCC CURB TYPE 1
TYPE C	INTEGRAL PCC CURB & GUTTER, TYPE 4, PCC CURB TYPE 3
TYPE D	INTEGRAL PCC CURB & GUTTER, TYPE 2
TYPE E	PCC CURB TYPE 2

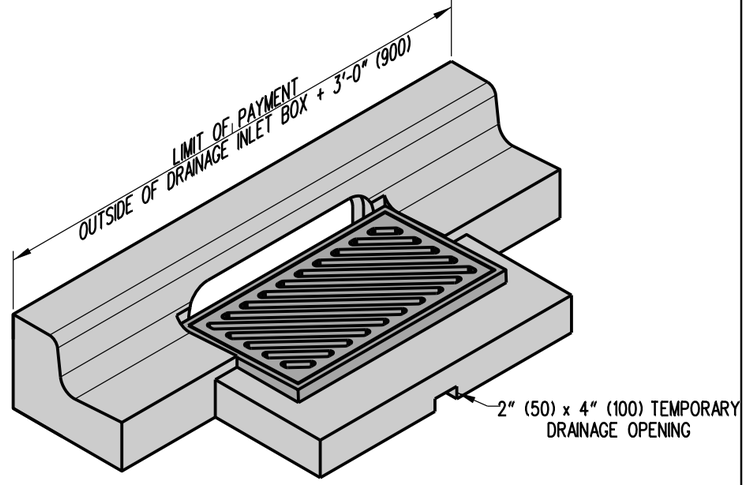


S501 BENDING DIAGRAM

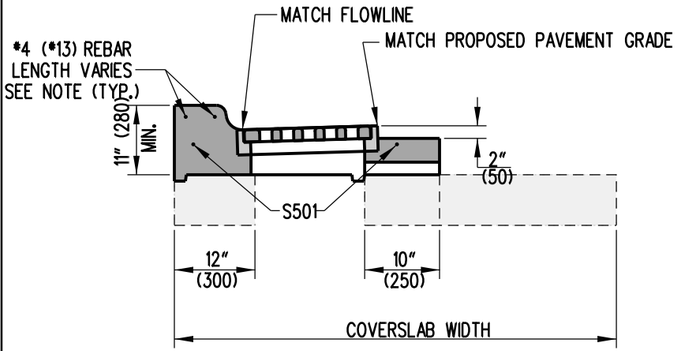
S501 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.



ISOMETRIC VIEW
TYPE E UNIT SHOWN



ISOMETRIC VIEW
TYPE B TOP UNIT SHOWN WITH INTEGRAL CURB & GUTTER TYPE 3



TYPE C

NOTE: LENGTH OF *4 (*13) REBAR SHALL BE THE OUTSIDE OF THE DRAINAGE INLET BOX PLUS 2'-9" (830).

DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET TOP UNITS

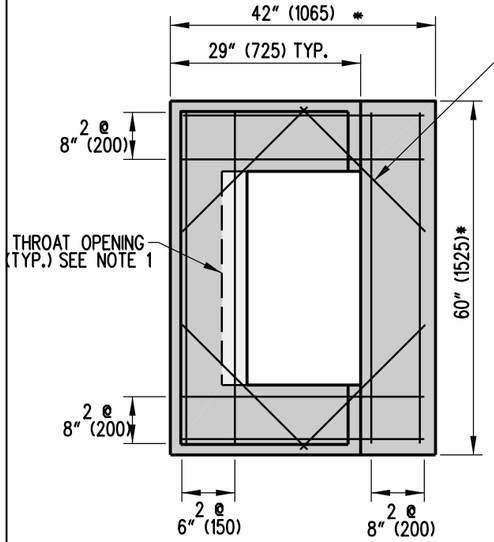
STANDARD NO. D-5 (2010) | SHT. 3 OF 9

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

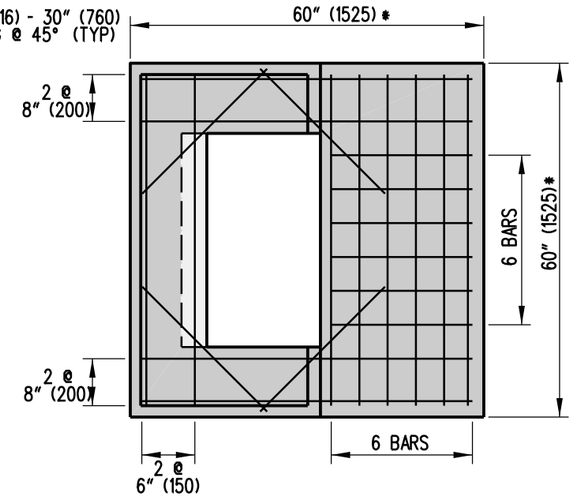
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/28/2010

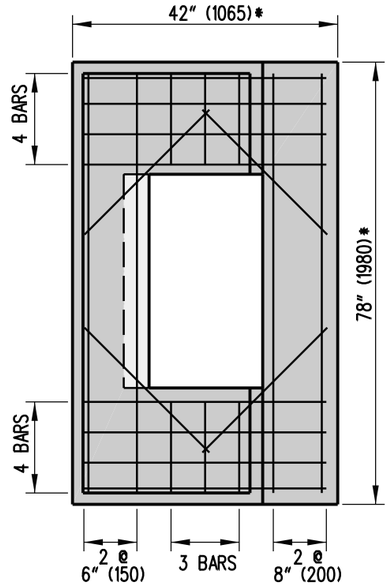
SCALE : N.T.S.



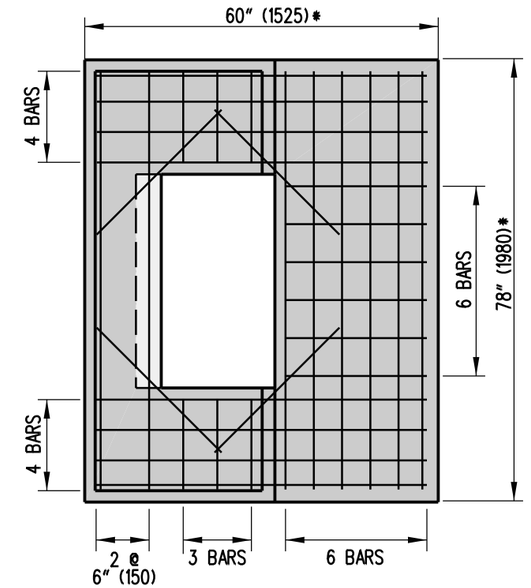
48" (1220) x 30" (760) INLET



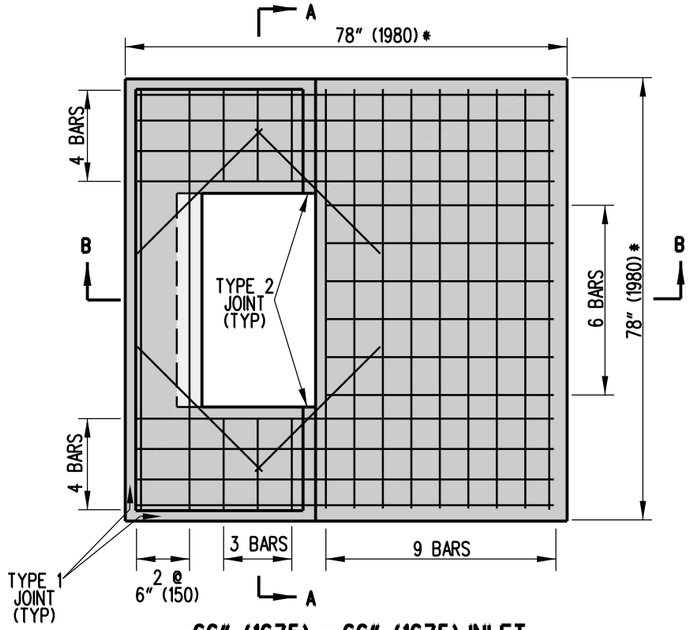
48" (1220) x 48" (1220) INLET



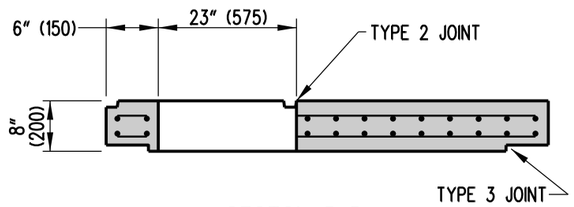
66" (1675) x 30" (760) INLET



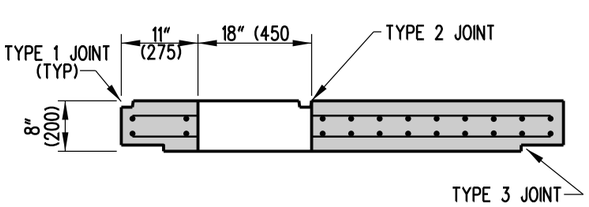
66" (1675) x 48" (1220) INLET



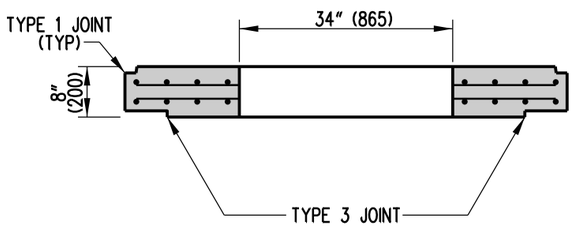
66" (1675) x 66" (1675) INLET



SECTON B-B
FOR TYPE B TOP UNITS



SECTON B-B
FOR TYPES A, C, D, & E TOP UNITS



SECTION A-A

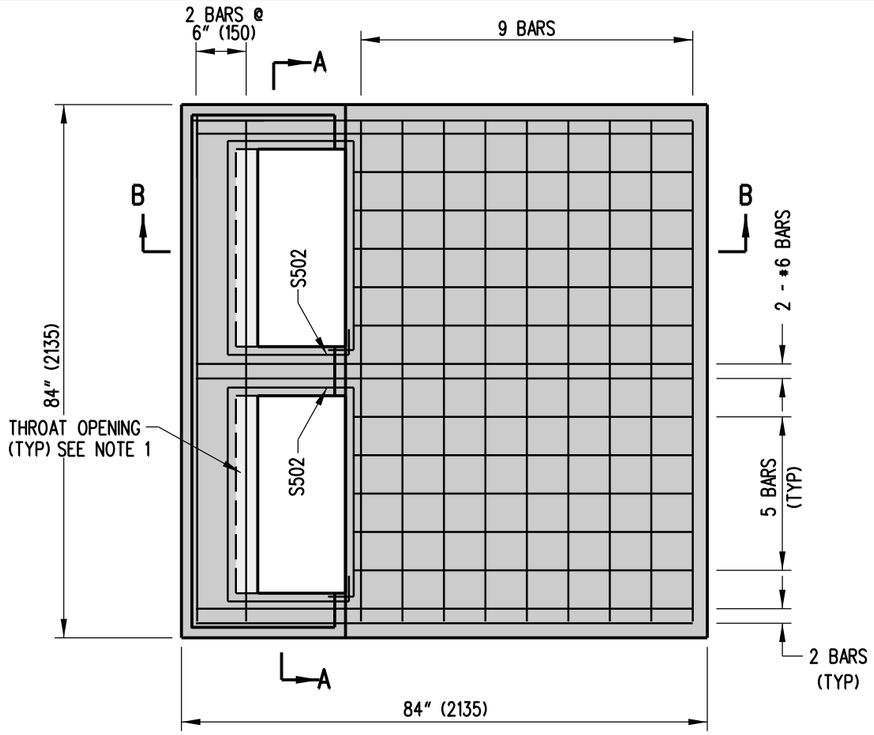
NOTES :

1). RELOCATE ENCROACHING REINFORCING BARS WHEN USING TYPE B UNIT.
2). COVER SLABS SHALL BE PRECAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
3). ALL BARS ARE TO BE #5 (#16) SPACED @ 6" (150) UNLESS NOTED OTHERWISE. TOP REINFORCEMENT SHALL BE 0.11 IN^2 (70 mm^2) HORIZONTAL REINFORCEMENT PER FOOT IN BOTH DIRECTIONS.
4). MINIMUM BAR COVER = 1 ½" (38).

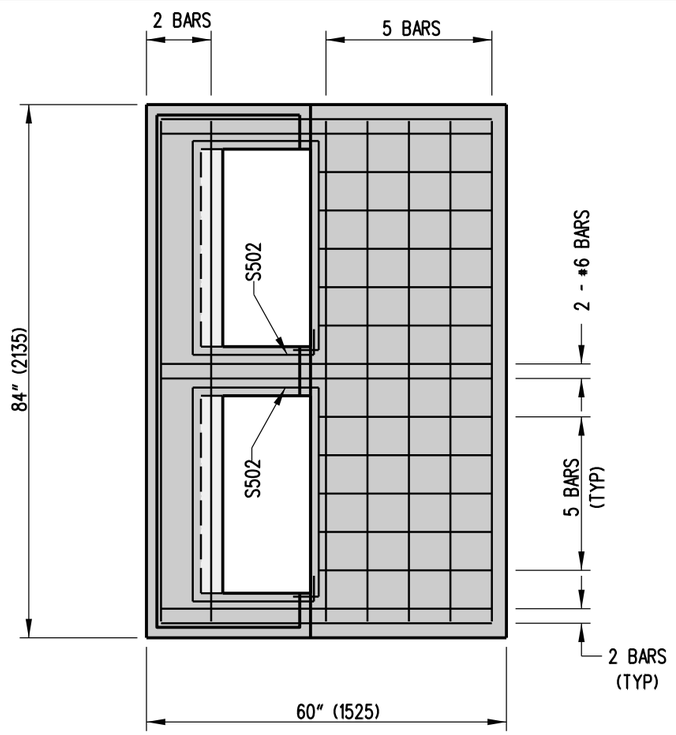
* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET COVER SLAB DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010)	SHT. 4 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

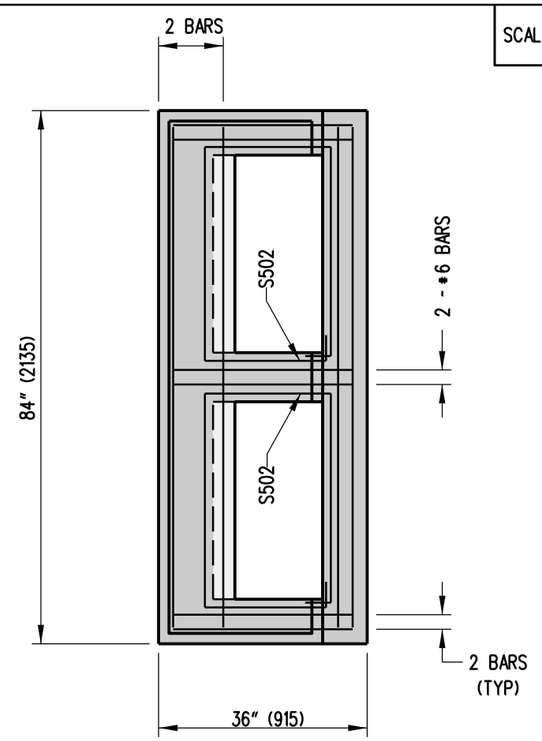
SCALE : N.T.S.



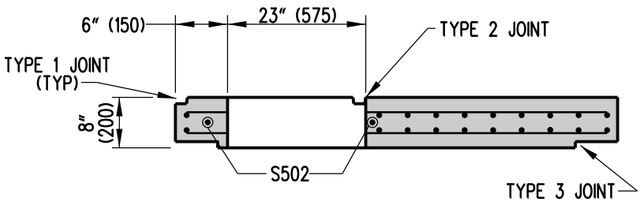
72" (1830) x 72" (1830) INLET



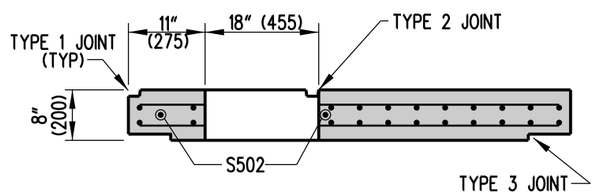
72" (1830) x 48" (1220) INLET



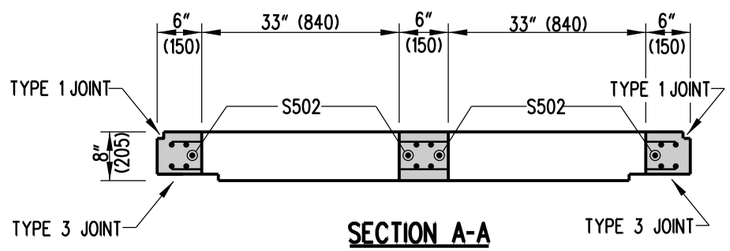
72" (1830) x 24" (610) INLET



SECTON B-B
FOR TYPE B TOP UNITS



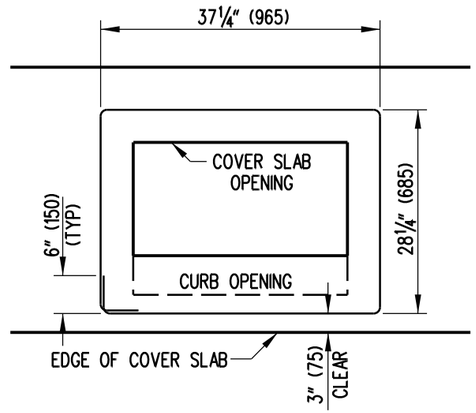
SECTON B-B
FOR TYPES A, C, D, & E TOP UNITS



SECTION A-A

NOTES :

1). RELOCATE ENCROACHING REINFORCING BARS WHEN USING TYPE B TOP UNIT.
2). COVER SLABS ARE TO BE PRECAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
3). ALL BARS ARE TO BE #5 (#16) SPACED @ 6" (150) UNLESS NOTED OTHERWISE. TOP REINFORCEMENT SHALL BE 0.11 IN^2 (70 mm^2) MIN. HORIZONAL REINFORCEMENT PER FOOT IN BOTH DIRECTIONS.
4). MINIMUM BAR COVER = 1 1/2" (38).

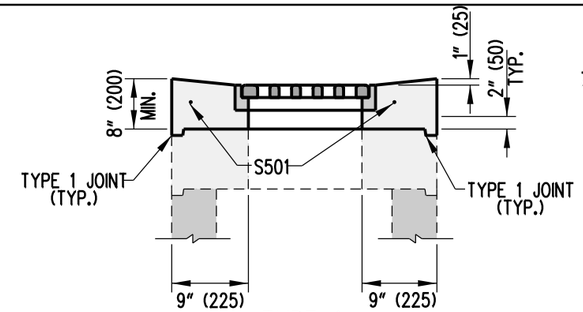


S502 BENDING DIAGRAM

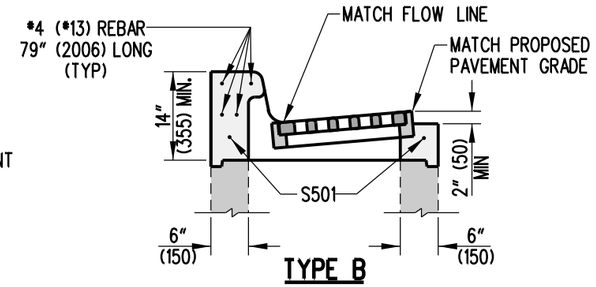
S502 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

DELAWARE DEPARTMENT OF TRANSPORTATION	DOUBLE INLET COVER SLAB DETAILS	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010) SHT. 5 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

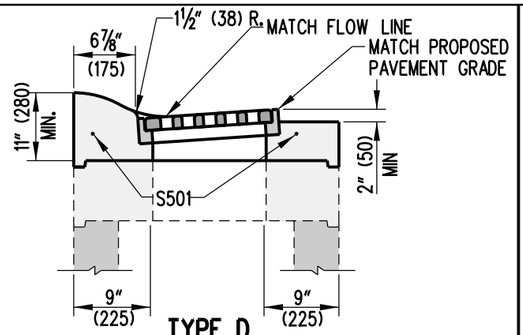
12/23/2010



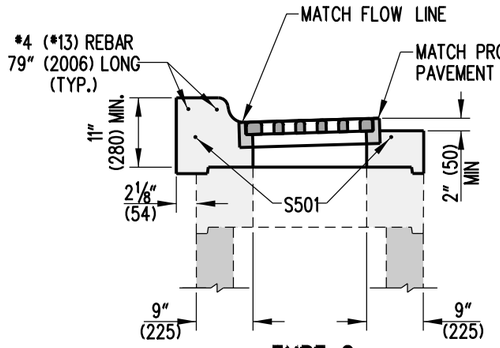
TYPE A



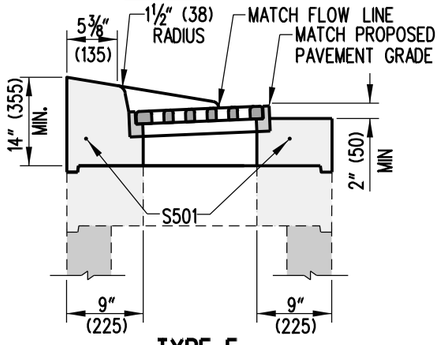
TYPE B



TYPE D



TYPE C

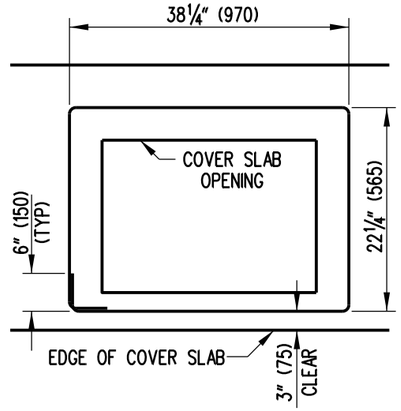


TYPE E

TOP UNIT DETAILS

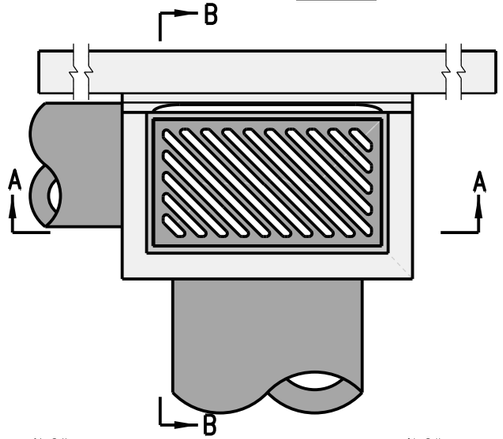
NOTE: SEE DETAIL D-5, SHEET 3 OF 9 FOR INLET TOP UNIT APPLICATIONS.

SCALE : N.T.S.

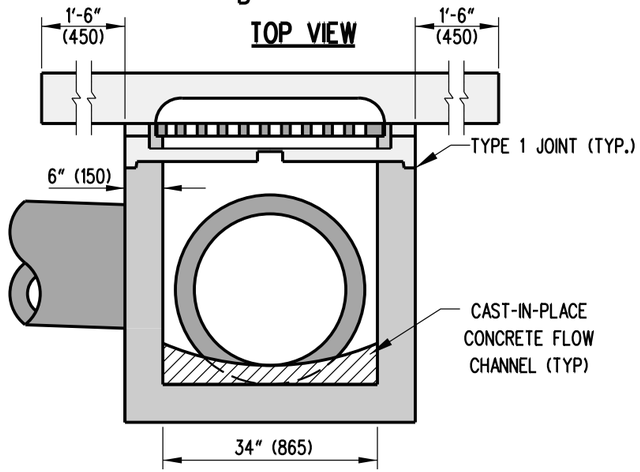


S503 BENDING DIAGRAM

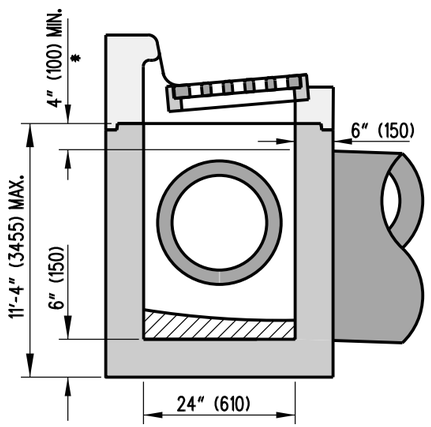
S503 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.



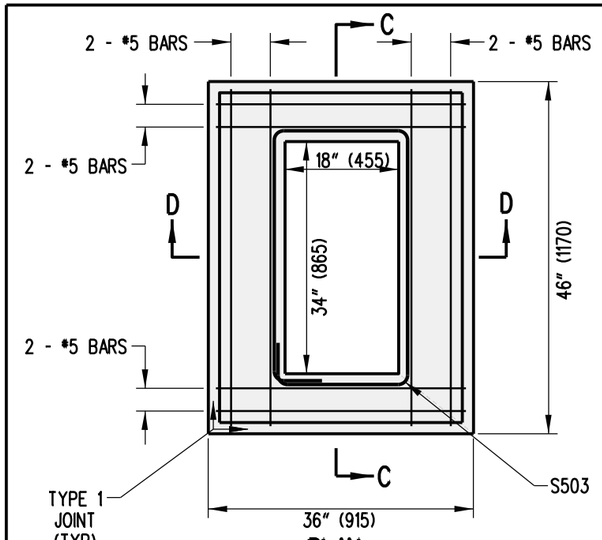
TOP VIEW



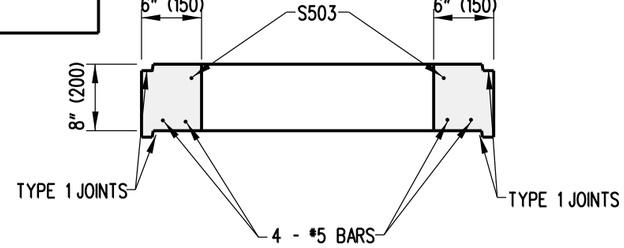
SECTION A-A



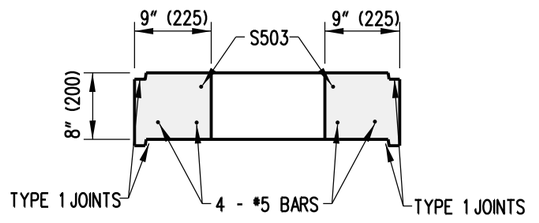
SECTION B-B



PLAN



SECTION C-C



SECTION D-D

DRAINAGE INLET DETAILS

NOTE: REFER TO PREVIOUS SHEETS FOR REINFORCING REQUIREMENTS
* - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD NO. D-4, SHEET 1 OF 1

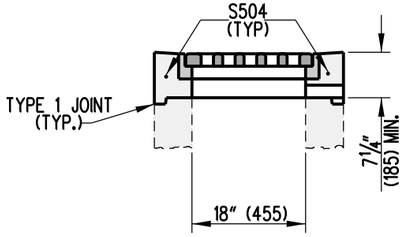
COVER SLAB DETAILS

NOTE: COVER SLAB IS ONLY NEEDED FOR TYPES A, C, D, & E TOP UNITS FOR THE 34" (865) x 24" (610) DRAINAGE INLET.

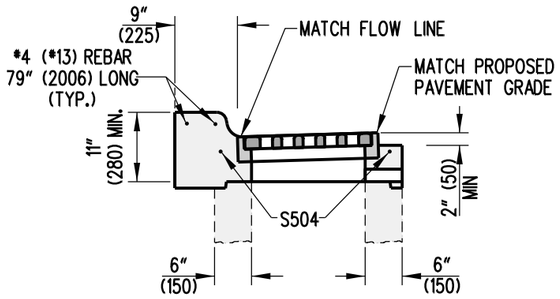
DELAWARE DEPARTMENT OF TRANSPORTATION	34" (865) x 24" (610) DRAINAGE INLET AND COVER SLAB DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010)	SHT. 6 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/28/2010

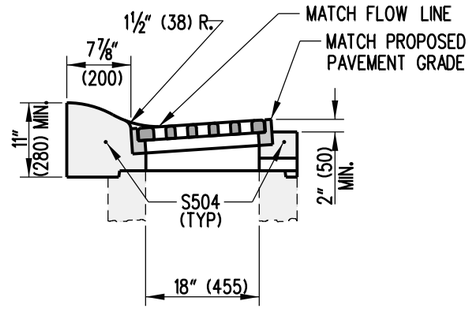
SCALE : N.T.S.



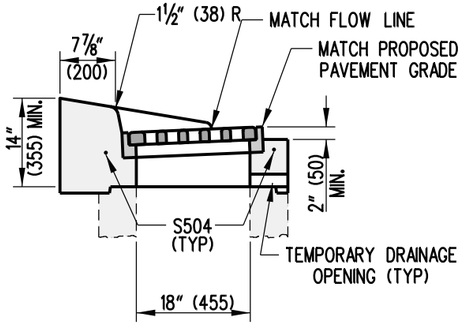
TYPE A



TYPE C

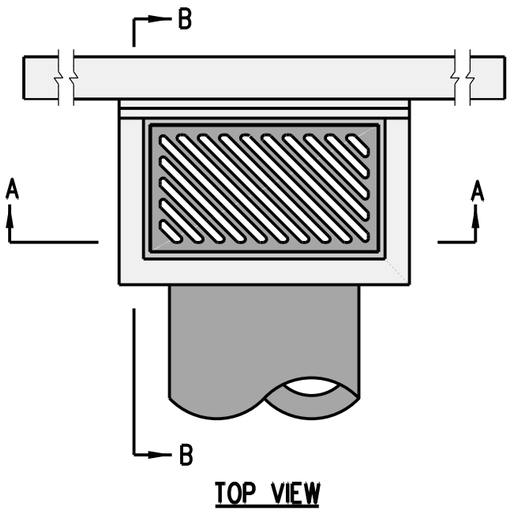


TYPE D

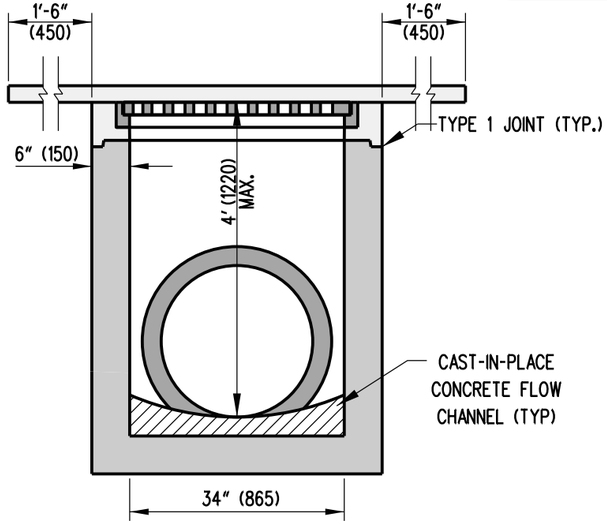


TYPE E

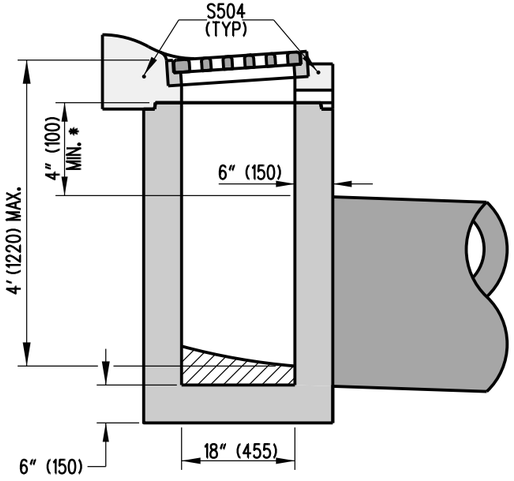
TOP UNIT DETAILS



TOP VIEW

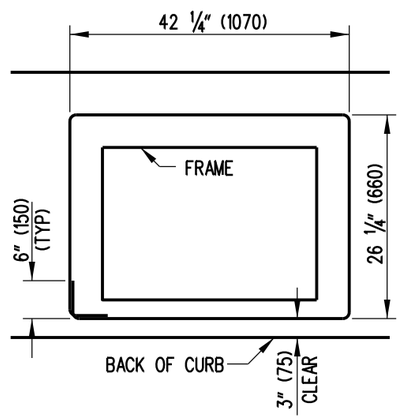


SECTION A-A



SECTION B-B

* - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD D-4, SHEET 1 OF 1.



S504 BENDING DIAGRAM

S504 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

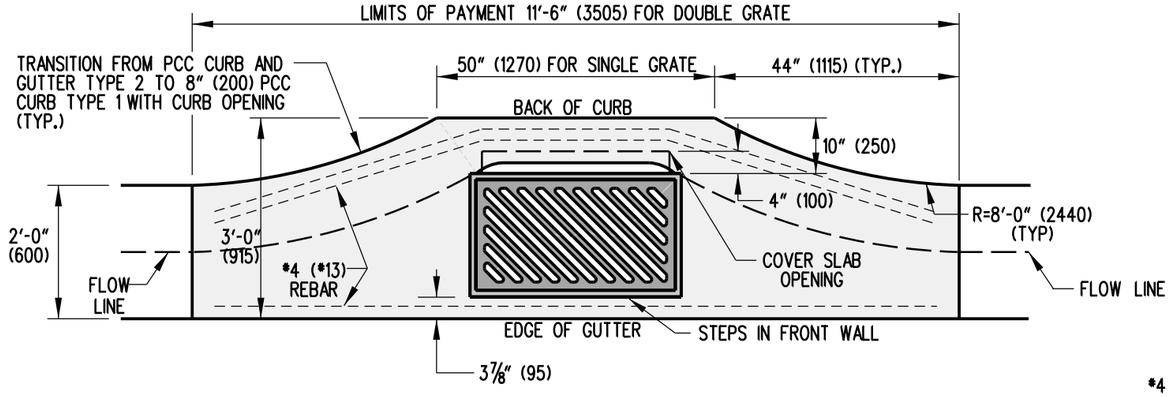
NOTES:

1). REFER TO PREVIOUS SHEETS FOR REINFORCEMENT REQUIREMENTS.
2). THE HEIGHT OF THIS INLET IS LIMITED TO 4' (1220) MAXIMUM, THEREFORE STEPS WILL NOT BE REQUIRED AND SHOULD NOT BE INSTALLED ON THIS INLET.
3). REFER TO DETAIL D-5, SHEET 3 OF 9 FOR INLET TOP UNIT APPLICATION.

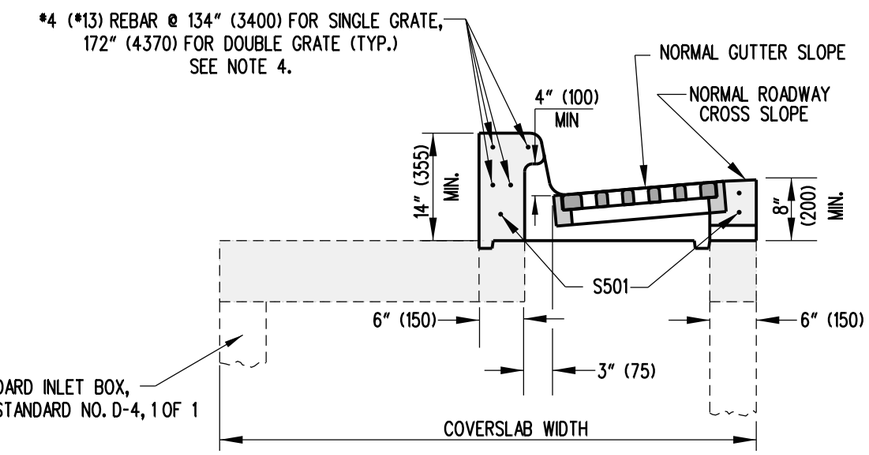
DELAWARE DEPARTMENT OF TRANSPORTATION	34" (865) x 18" (455) DRAINAGE INLET DETAILS	APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE
	STANDARD NO. D-5 (2010) — SHT. 7 OF 9	RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

10/28/2010

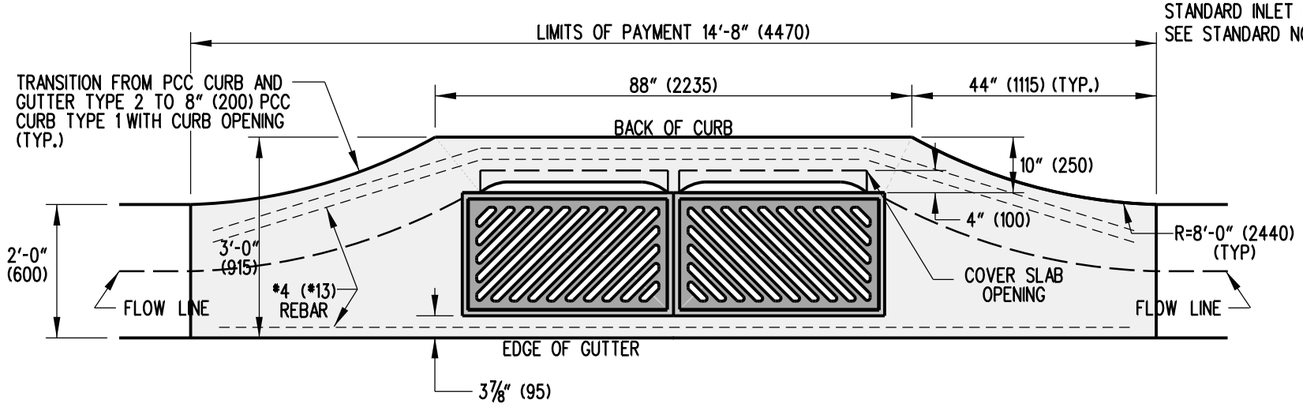
SCALE : N.T.S.



SINGLE GRATE SETUP



SUBDIVISION TOP & CONFIGURATION



DOUBLE GRATE SETUP

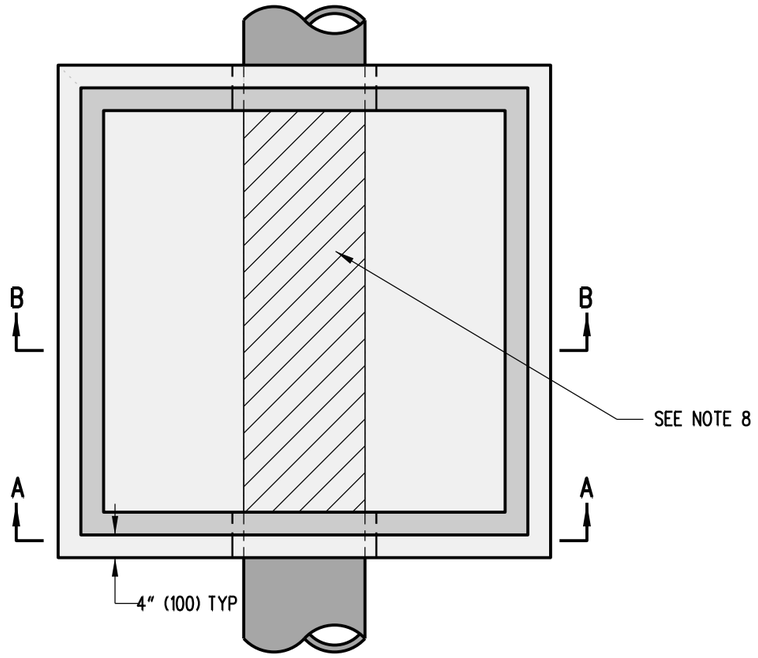
NOTES:

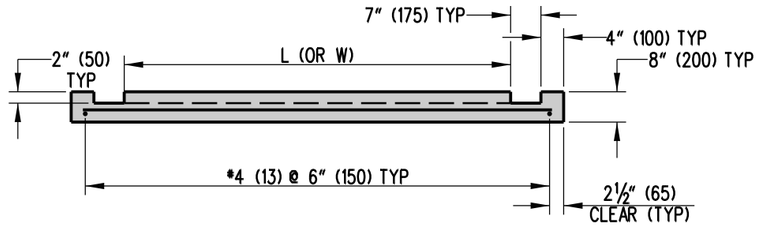
1). MINIMUM BOX SIZE TO BE 34" (850) x 24" (600).
2). PIPE OPENINGS IN THE FRONT WALL SHALL NOT INTERFERE WITH THE STEPS. THE PIPE SHALL BE SHIFTED HORIZONTALLY TO AVOID THE STEPS. IT MAY BE NECESSARY TO USE A LARGER BOX TO AVOID CONFLICT BETWEEN STEPS AND PIPE OPENING.
3). SEE DETAIL D-5, SHEET 3 OF 9, FOR S501 BAR DIAGRAM.
4). THE REBAR IN THE HEAD IS PREFERRED TO BE 1 CONTINUOUS PIECE, HOWEVER, IF MULTIPLE PIECES ARE TO BE USED, EACH PIECE SHALL OVERLAP BY 12" (300) MINIMUM AND THE FINAL LENGTH OF THE SPLICED REBAR SHALL BE AS NOTED ON THIS DETAIL.

DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET TOP UNIT, TYPE S		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010)	SHT. 8 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

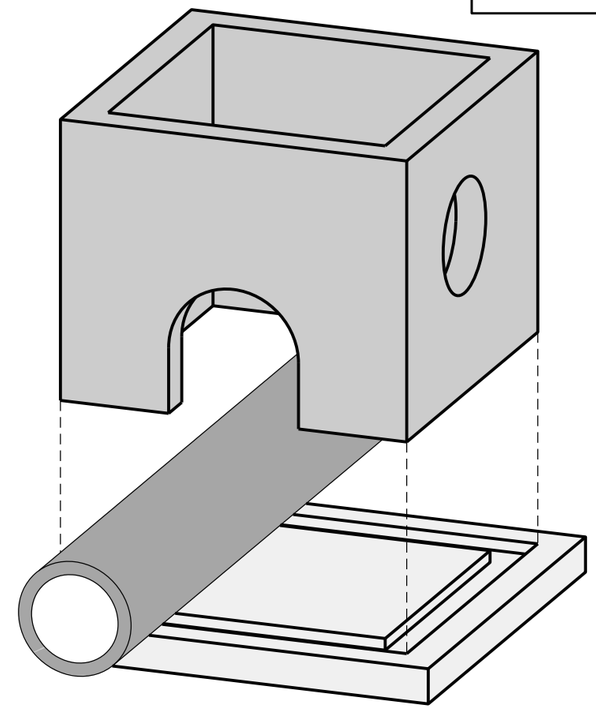
12/23/2010

SCALE : N.T.S.



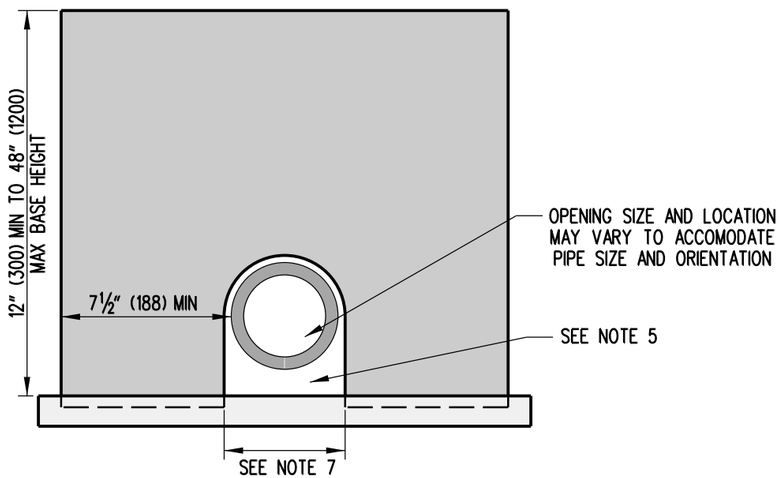


CAST-IN-PLACE BOTTOM
SECTION VIEW

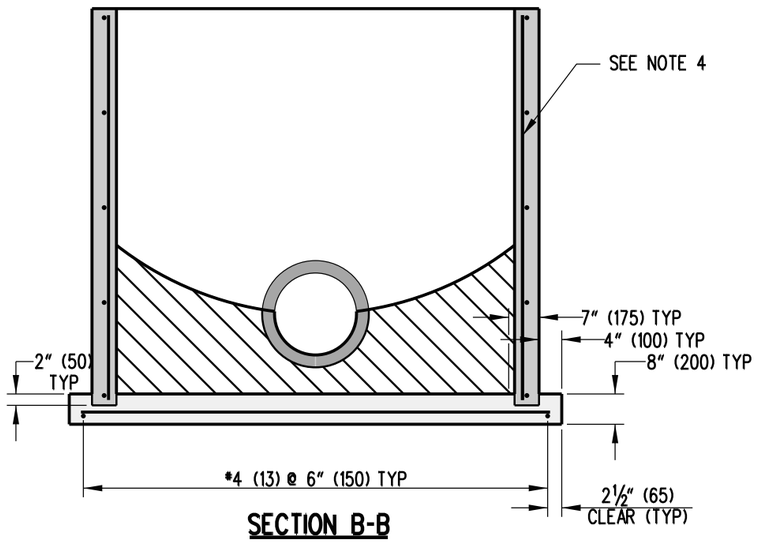


ISOMETRIC VIEW

PLAN VIEW



SECTION A-A



SECTION B-B

NOTES:

1). SEE DETAIL D-4, SHEET 1 OF 1 FOR BOX DETAILS AND NOTES.
2). ALL REINFORCEMENT SHALL HAVE A MINIMUM COVER OF 1 ½" (38) UNLESS NOTED OTHERWISE.
3). PIPE SHALL BE SUPPORTED ON BOTH ENDS DURING THE CONSTRUCTION OF THE BASE.
4). VERTICAL WALL REINFORCEMENT SHALL COMPLY WITH A.S.T.M. A615, 0.12 IN/FT IN EACH DIRECTION, VERTICALLY AND HORIZONTALLY.
5). DOGHOUSE OPENING SHALL BE FILLED WITH HIGH STRENGTH, NON-SHRINK GROUT MIXED WITH COARSE AGGREGATE IN A 1:1 RATION BY WEIGHT.
6). THE TOP OF THE DOGHOUSE OPENING SHALL, IN NO CIRCUMSTANCES, BE LESS THAN 4" (100) FROM THE TOP OF THE BOX.
7). DOGHOUSE OPENING WIDTH SHALL BE BETWEEN 3" (75) AND 4" (100) LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE AND SHALL NOT ENCROACH ON THE ADJACENT WALL.
8). EXISTING PIPE IS TO EITHER BE COMPLETELY REMOVED BY SAWCUTTING AS CLOSE TO THE INSIDE BOX WALL AS POSSIBLE, OR BY REMOVING THE TOP PORTION OF THE PIPE AND USING THE REMAINING PIPE SECTION AS THE BOTTOM OF THE FLOW CHANNEL, AS SHOWN IN SECTION B-B.

DELAWARE
DEPARTMENT OF TRANSPORTATION

DOGHOUSE INLET BOX

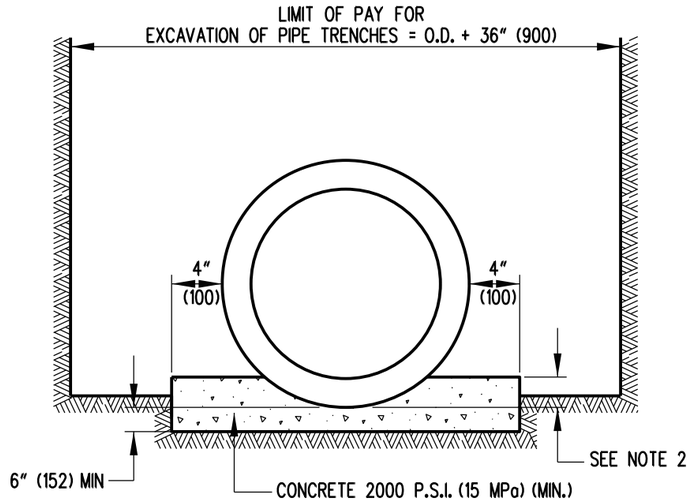
STANDARD NO. D-5 (2010) | SHT. 9 OF 9

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

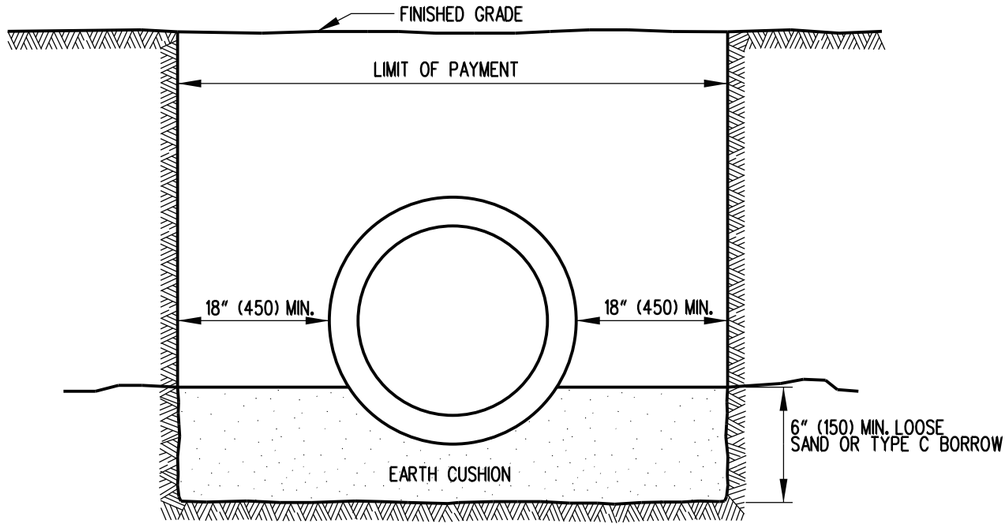
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

08/08/2010

SCALE : N.T.S.



CLASS A BEDDING



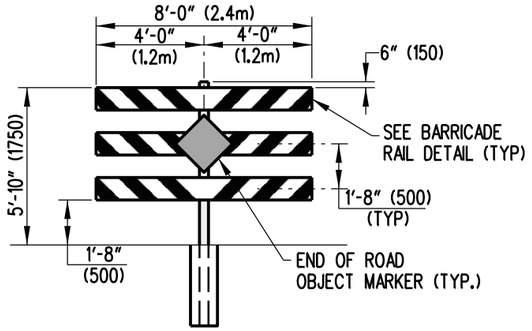
CLASS C BEDDING

NOTE:
1). USE CLASS C BEDDING UNLESS OTHERWISE INDICATED.
2). FOR CLASS A BEDDING, IMBED PIPE IN CONCRETE 6" (152) FOR PIPES SMALLER THAN 24" (610) I.D., 10" (255) FOR PIPES 24" (610) TO 60" (1525), AND FOR PIPES LARGER THAN 60" (1525) SEE PROJECT DETAILS.

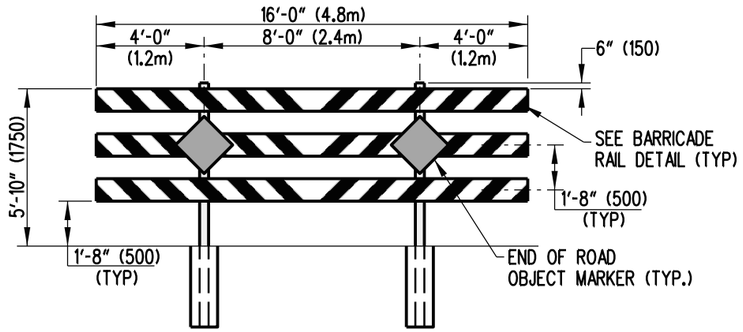
DELAWARE DEPARTMENT OF TRANSPORTATION	**PIPE BEDDING**	**APPROVED** SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-8 (2010) **SHT. 1 OF 1**	**RECOMMENDED** SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/25/2010

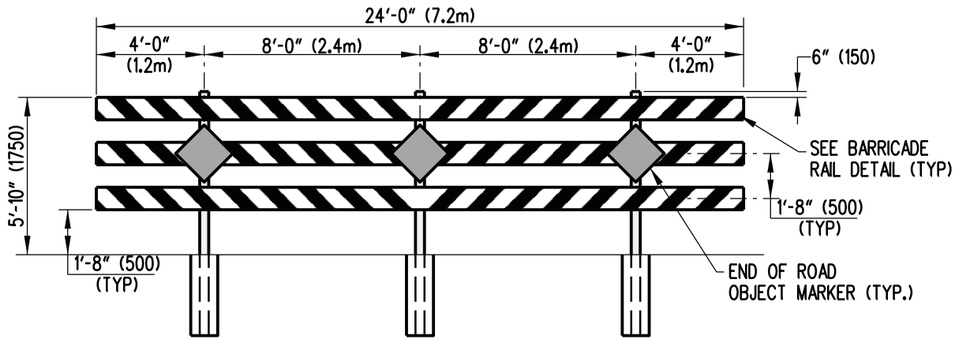
SCALE : N.T.S.



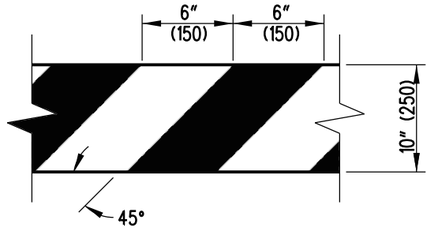
1-POST PERMANENT WOOD BARRICADE DETAIL



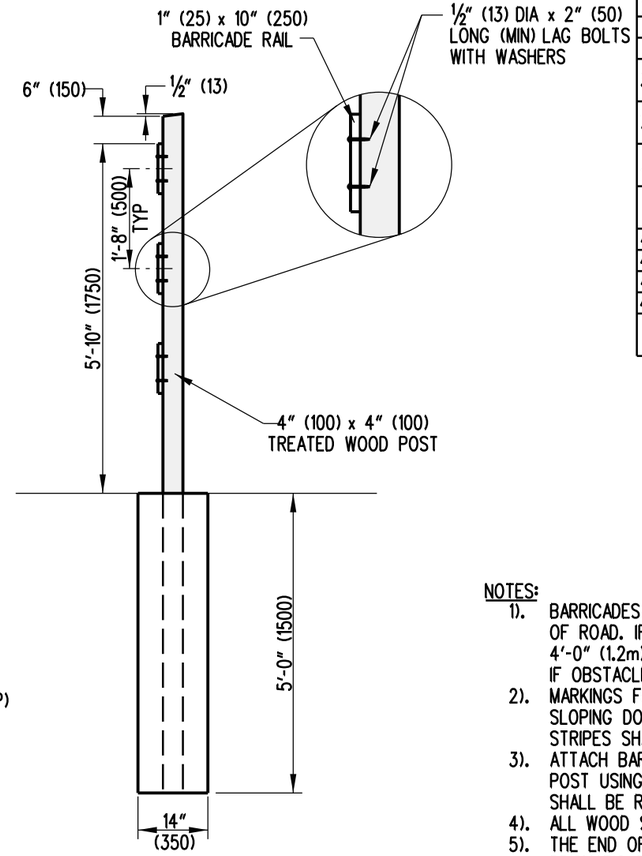
2-POST PERMANENT WOOD BARRICADE DETAIL



3-POST PERMANENT WOOD BARRICADE DETAIL



BARRICADE RAIL DETAIL



BARRICADE POST DETAIL

WOOD BARRICADE POST CHART			
ROADWAY WIDTH	NUMBER OF BARRICADES	TYPE OF POST	OUTSIDE OVERHANG
4'-0" (1.2m)	1	1-POST	2'-0" (600)
6'-0" (1.8m)	1	1-POST	3'-0" (900)
8'-0" (2.4m)	1	1-POST	4'-0" (1.2m)
10'-0" (3m)	1	2-POST	1'-0" (300)
12'-0" (3.6m)	1	2-POST	2'-0" (600)
14'-0" (4.2m)	1	2-POST	3'-0" (900)
16'-0" (4.8m)	1	2-POST	4'-0" (1.2m)
18'-0" (5.4m)	1	3-POST	1'-0" (300)
20'-0" (6m)	1	3-POST	2'-0" (600)
22'-0" (6.6m)	1	3-POST	3'-0" (900)
24'-0" (7.2m)	1	3-POST	4'-0" (1.2m)
26'-0" (7.8m)	2	2-POST	1'-0" (300)
28'-0" (8.4m)	2	2-POST	2'-0" (600)
30'-0" (9m)	2	2-POST	3'-0" (900)
32'-0" (9.6m)	2	2-POST	4'-0" (1.2m)
34'-0" (10.2m)	2	2-POST 3-POST	1'-0" (300)
36'-0" (10.8m)	2	2-POST 3-POST	2'-0" (600)
38'-0" (11.4m)	2	2-POST 3-POST	3'-0" (900)
40'-0" (12m)	2	2-POST 3-POST	4'-0" (1.2m)
42'-0" (12.6m)	2	3-POST	1'-0" (300)
44'-0" (13.2m)	2	3-POST	2'-0" (600)
46'-0" (13.8m)	2	3-POST	3'-0" (900)
48'-0" (14.4m)	2	3-POST	4'-0" (1.2m)
50'-0" (15m)	3	(2) 2-POST <ENDS> (1) 3-POST <CENTER>	1'-0" (300)

NOTES:

1). BARRICADES SHALL BE PLACED COMPLETELY ACROSS THE ROADWAY FROM EDGE OF ROAD TO EDGE OF ROAD. IF NECESSARY, THE BARRICADE OVERHANG BEYOND THE OUTSIDE POSTS (TYPICALLY 4'-0" (1.2m)) MAY BE REDUCED TO THE "OUTSIDE OVERHANG' VALUE INDICATED IN THE TABLE ABOVE IF OBSTACLES ARE PRESENT BEYOND THE ROADWAY EDGE.

2). MARKINGS FOR BARRICADE RAILS SHALL BE ALTERNATING FLUORESCENT RED AND WHITE STRIPES, SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES, USING PRISMATIC, RETROREFLECTIVE SHEETING. STRIPES SHALL SLOPE DOWNWARD TOWARDS THE CENTER OF THE CLOSURE.

3). ATTACH BARRICADE RAIL AND OBJECT MARKER TO THE 4" (100) x 4" (100) PRESSURE TREATED WOOD POST USING LAG BOLTS (2" (50) LONG, MINIMUM) WITH WASHERS. TWO BOLTS PER RAIL PER POST SHALL BE REQUIRED.

4). ALL WOOD SHALL BE PRESSURE TREATED.

5). THE END OF ROAD OBJECT MARKER (MUTCD CODE OM4-3) SHALL BE 18" (450) x 18" (450) WITH RED PRISMATIC, RETROREFLECTIVE SHEETING.

6). TREATED WOOD POST SHALL BE PLACED IN PRE-DUG HOLE, BACKFILLED USING SUITABLE MATERIAL, AND TAMPERED THOROUGHLY TO PROVIDE A RIGID SUB-SURFACE CONDITION AROUND THE POST.

7). BARRICADE RAILS MAY BE CONSTRUCTED USING PLASTIC OR WOOD AND SHOULD NOT BE METAL.

8). LONGER WIDTH CLOSERS CAN BE ACCOMODATED BY VARIOUS COMBINATIONS OF 2-POST AND 3-POST BARRICADES.

DELAWARE
DEPARTMENT OF TRANSPORTATION

WOOD BARRICADE DETAIL

STANDARD NO. T-16 (2010) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/19/2010